YUKON RIVER REGION

2002 Fisheries Resource Monitoring Plan

Review Draft

Federal Subsistence Management Program

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INTRODUCTION

Background

On October 1, 1999, the Secretaries of the Interior and Agriculture expanded Federal subsistence fisheries management in Alaska under Title VIII of ANILCA. To meet this management responsibility, the Federal Subsistence Board established the Fisheries Resource Monitoring Program to gather information on fish stock status and trends, subsistence harvest patterns, and traditional ecological knowledge. Improving the range of available information is crucial to effective fisheries management—both to protect Fisheries resources and to ensure the subsistence priority.

The Fisheries Resource Monitoring Program funds studies to gather, analyze, and report information needed to manage and conserve subsistence Fisheries resources, address fisheries issues and priorities identified by the Regional Advisory Councils, minimize Fisheries conflicts, and address regulatory actions before the Board. The Board has adopted a unified approach where Federal agencies work together with State, Tribal and local organizations. The Monitoring Program is multi-disciplinary, blending together the biological and social sciences with traditional ecological knowledge to manage and conserve Fisheries resources and ensure priority is given to subsistence users on Federal Conservation Units in Alaska.

The five Federal agencies work with Alaska Department of Fish and Game, Regional Councils, Alaska Native tribes, and other organizations to implement the Monitoring Program. The Federal Subsistence Board continues to rely on the special role of the Regional Councils to document Fisheries issues and data needs, and to provide recommendations on studies to implement the Monitoring Program. The purpose of this booklet is to document management issues and information needs, and to present the 2002 draft Fisheries Resource Monitoring Plan.

Study Selection Process

To develop an effective and scientifically sound monitoring program, local input on management issues and information needs is vital to ensure that the highest priority subsistence needs are addressed. During the winter 2001 and fall 2000 Regional Advisory Council meetings, the Councils were requested to provide this input as an important first step in the development of the 2002 Fisheries Resource Monitoring Plan. Subsistence users, the public, tribes, ADF&G, and Federal agencies worked with the Regional Advisory Councils to identify issues and information needs. This information is summarized in the overview for each region.

To ensure studies are scientifically sound and address subsistence priorities, the Board has developed a process where interested parties submit study proposals that address the management issues and information needs identified by the Regional Councils. Proposals are evaluated by Fisheries Information Services Division staff and the Technical Review Committee using four ranking factors: strategic priorities, technical-scientific merit, past performance-administrative expertise, and partnership-capacity building, as detailed on the next page.

Ranking Factors for Federal Subsistence Fisheries Studies

Strategic Priorities

Ideal studies will be responsive to the issues and information needs identified within the Regional Advisory Councils. Studies should address the criteria listed below and must fully meet the first criteria to be eligible for Federal subsistence funding.

1. **Federal Jurisdiction** – Issue or information needs addressed in studies must have a direct association to a subsistence fishery within a Federal Conservation Unit.
2. **Conservation Mandate** – Risk to the conservation of species and populations that support subsistence fisheries and risk to conservation unit purposes.
3. **Allocation Priority** – Risk of failure to provide a priority to subsistence uses and risk that subsistence harvest needs will not be met.
4. **Data Gaps** – Amount of information available to support subsistence management (higher priority given where a lack of information exists).
5. **Role of Resource** – Importance of a species to a subsistence harvest (e.g., number of villages affected, pounds of fish harvested, miles of river) and qualitative significance (e.g., cultural value, unique seasonal role).
6. **Local Concern** – Level of user concerns over subsistence harvests (e.g., allocation – upstream vs. downstream, recreational use concerns, changes in size of fish).

Technical-Scientific Merit

Technical quality of the study design must meet accepted standards for information collection, compilation, analysis, and reporting. Excellent studies will have clear study objectives, appropriate sampling design, correct statistical analysis procedures, and specified progress and final reports.

Past Performance-Administrative Expertise

Investigators and their organizations should have demonstrated technical and administrative expertise to complete the study or have co-investigators or appropriate partnerships with other organizations to meet all requirements of the study. Studies must be non-duplicative with other studies. Principal and co-investigators should possess the expertise required to complete the study and have had successful experience with similar studies.

Partnership-Capacity Building

Studies must include appropriate partners and contribute to the capacities of agencies, local communities, and residents to participate in fishery resource management. Studies must have completed appropriate consultation about their study with local villages and communities in the area where the study is to be conducted (letters of support from local organizations add to the strength of a proposal). Investigators and their organizations should be able to demonstrate the ability to maintain effective local relationships and a commitment to capacity building.

For studies that best meet the four ranking factors and address Regional Council priorities, investigation plans are prepared to more fully evaluate the studies against the ranking factors and

Council issues. The investigation plans are reviewed by the Technical Review Committee, and the highest quality proposals that address urgent management concerns are then put together into a draft monitoring plan. Because local involvement and capacity building are critical components of the Monitoring Program, the draft plan is presented to the Regional Councils for their review. Public input is also gathered, and the draft plan is presented to the Federal Subsistence Board, along with Regional Council and public comments. For the 2002 Monitoring Plan, the Board will make decisions on the final plan in December, 2001. Most studies approved by the Board will begin during summer, 2002.

2002 Fisheries Resource Monitoring Plan

In 2002, Congress continued to fund implementation of the Fisheries Resource Monitoring Program. During 2002, the U.S. Fish and Wildlife Service will provide $5.25 million and the U.S. Forest Service will provide $2.0 million, for a total of $7.25 million for the continuation of existing studies and for new study starts. Money for new study starts, the 2002 Fisheries Resource Monitoring Plan, was first allocated by data type and geographic region to establish target budget levels for 2002 study funding:

- To maintain the multi-disciplinary approach of the Fisheries Resource Monitoring Program, two-thirds of the funding will be targeted at stock status and trends studies, and one-third at harvest monitoring and traditional ecological knowledge.

- The program also wishes to achieve an appropriate balance between the six geographic regions: Arctic/Kotzebue/Norton Sound, Yukon River, Kuskokwim River, Bristol Bay/ Alaska Peninsula/Kodiak, Cook Inlet/Gulf of Alaska, and Southeast Alaska. It is recognized that, based on the distribution of Federal lands and waters, the management issues confronting the Board are greater in some regions than others. The Yukon and Kuskokwim rivers, for example, have large Federal land areas, with intensive subsistence fisheries. A portion of the funding is also allocated to inter-regional studies to address statewide concerns.

Other considerations and policy decisions entered into recommendations for 2002 study funding:

- The Technical Review Committee recommended studies that attempt to balance across species (salmon, resident species), study type (e.g., fish weirs, test fisheries, sonar, genetics, escapement, biology, harvest assessment, subsistence harvest mapping), and geographically within a region (up river, down river).

- At the direction of the Board, a minimum of 60% of the study funding is dedicated to non-Federal sources.

- The Board provided guidance on types of activities that they did not find appropriate for funding under the Fisheries Resource Monitoring Program. Activities not eligible for funding include: a) habitat protection, restoration, and enhancement; b) hatchery propagation, restoration, enhancement, and supplementation; and c) contaminant

assessment, evaluation, and monitoring. These activities on Conservation System Units would most appropriately be addressed by the land management agencies.

- In 2002, the Partners for Fisheries Monitoring Program will be implemented at a proposed budget of $1.05 million. The Office of Subsistence Management will develop cooperative agreements to fill up to ten Partners for Fisheries Monitoring positions within Tribal, rural, or State organizations, including both fishery biologists and social scientists. These positions will help develop and implement Resource Monitoring Program studies, communicate the results of fisheries studies to various audiences (Federal Subsistence Board, Regional Advisory Councils, Office of Subsistence Management, regional organizations), and help develop the capacity of rural residents to effectively participate in the fishery management process.

Many studies approved by the Board in 2000 and 2001 were designed to continue on for several years. In 2002, approximately $5 million is required to fund the continuation of 2000 and 2001 studies. When making study recommendations in 2001, the Committee recommended to the Board that approximately one-third of the Monitoring Program funds be made available to initiate new studies in 2002 and 2003. Using carryover balances from the Program's first year of implementation, the U.S. Fish and Wildlife Service and U.S. Forest Service are capable of providing $2.1 million for new studies in 2002 **(Figure 1)**.

In 2003, we currently estimate that $1.2 million will be available for new studies. Unlike the 2002 process, investigation plans that are not selected for funding this year will not automatically become eligible for funding consideration next fiscal year. By insisting that investigators submit new proposals during the 2003 call for proposals, we will encourage submissions that: are current with Issues and Information Needs; addressed reviewer comments; and have updated their budgets. Investigators will need to submit new proposals requests for consideration of any new projects in 2003.

For the 2002 Fisheries Resource Monitoring Program, 120 new study proposals were submitted in February 2001. Of these, 48 were advanced for preparation of Investigation Plans. In addition, 9 studies submitted in 2001 that were not funded were advanced for reconsideration. The map below **(Map 1)** displays the geographic distribution of 57 studies advanced in 2002.

For the $2.1 million available for new studies, the Technical Review Committee recommended 31 studies for funding in 2002, including 14 stock status and trends studies and 17 harvest monitoring and TEK studies **(Tables 1 & 2).**

The 31 studies represent a balanced mix of studies that address Regional Council concerns, improve and strengthen fisheries management, quantify harvests, employ traditional ecological knowledge, and address regulatory actions before the Board. All studies are technically sound and expand upon the science-based monitoring program initiated in 2000 and 2001. For the 2002 studies recommended for funding by the TRC, approximately 40% of the funding would be directed at Tribal and local organizations (Non–governmental Organizations or NGO), approximately 40% to ADF&G, and approximately 20% to Federal agencies **(Figure 2).**

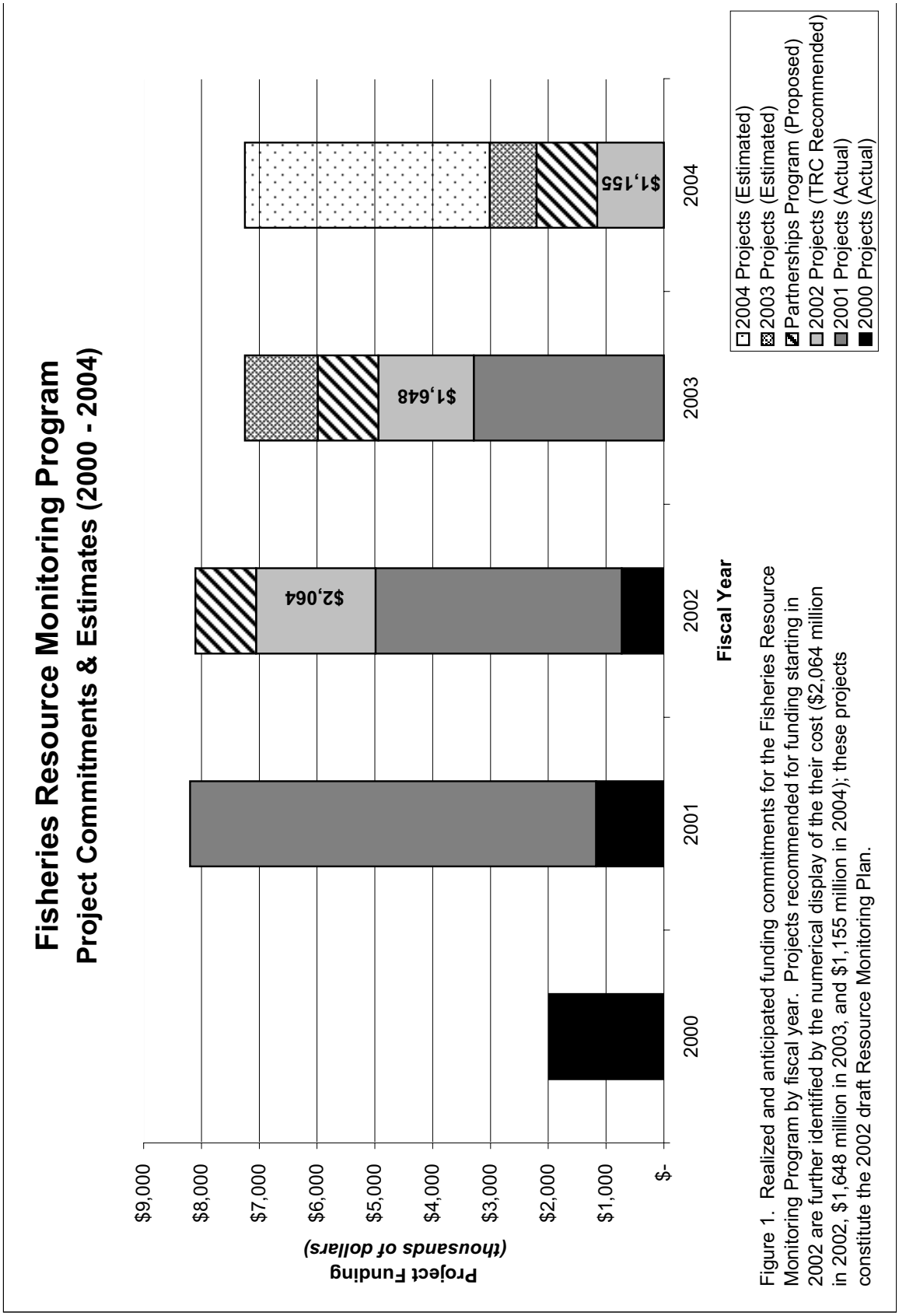


Figure 1. Realized and anticipated funding commitments for the Fisheries Resource Monitoring Program by fiscal year. Projects recommended for funding starting in 2002 are further identified by the numerical display of the their cost ($2,064 million in 2002, $1,648 million in 2003, and $1,155 million in 2004); these projects constitute the 2002 draft Resource Monitoring Plan.

Map 1. Distribution of projects for funding consideration under the 2002 Fisheries Resource Monitoring Program

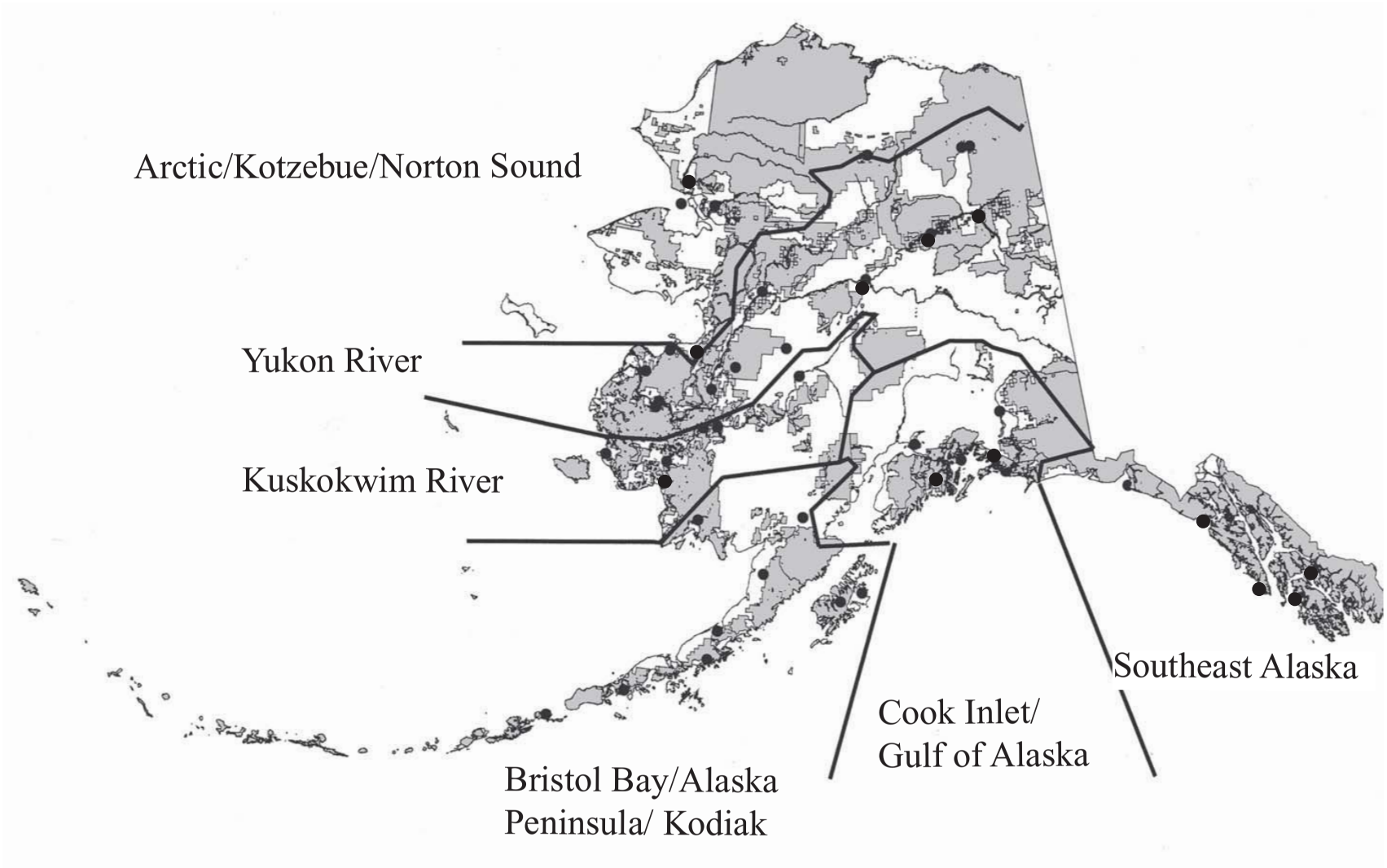


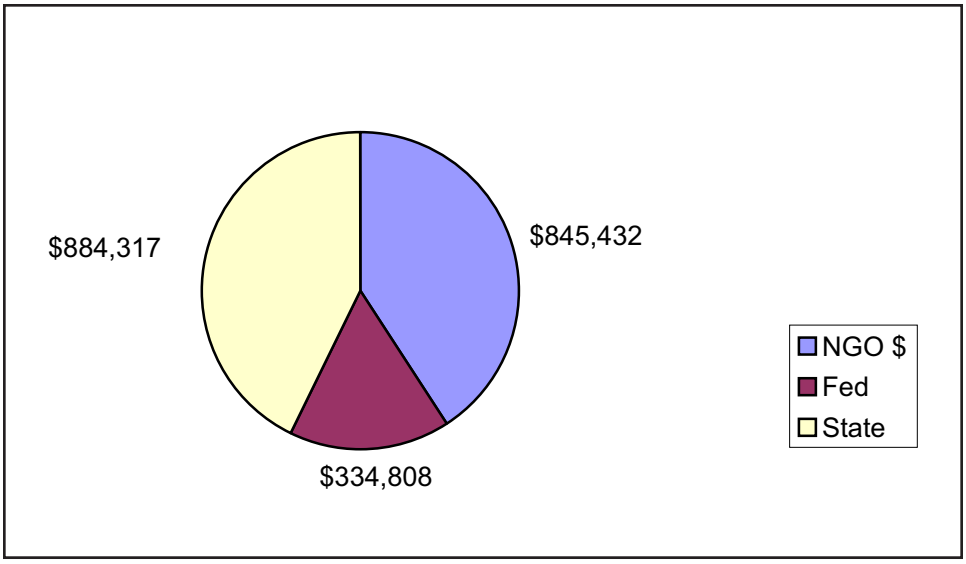
Table 1. Number of studies recommended for funding in fiscal 2002 by Technical Review Committee. Abbreviations for study information types are as follows: SST=Stock Status and Trends, HM=Harvest Monitoring, TEK=Traditional Ecological Knowledge

	Unfunded 2001 Studies			New 2002 Studies			**All Studies**			**Recommended Studies**		
Geographic Region	SST	HM-TEK	Total	SST	HM-TEK	Total	**SST**	**HM-TEK**	**Total**	**SST**	**HM-TEK**	**Total**
Arctic, Kotzebue, Norton Sound	0	0	0	3	4	7	**3**	**4**	**7**	**1**	**3**	**4**
Yukon River	2	0	2	4	5	9	**6**	**5**	**11**	**3**	**3**	**6**
Kuskokwim River	0	0	0	3	4	7	**3**	**4**	**7**	**2**	**3**	**5**
Bristol Bay, Kodiak	4	0	4	2	3	5	**6**	**3**	**9**	**3**	**1**	**4**
Cook Inlet, Gulf of Alaska	1	1	2	3	3	6	**4**	**4**	**8**	**1**	**3**	**4**
Southeast	1	0	1	5	4	9	**6**	**4**	**10**	**2**	**3**	**5**
Inter Regional	0	0	0	3	2	5	**3**	**2**	**5**	**2**	**1**	**3**
Total	8	1	9	23	25	48	**31**	**26**	**57**	**14**	**17**	**31**

Table 2. Cost of proposals recommended for funding in 2002 by the Technical Review Committee. Funding shown in thousands of dollars

	SST Studies		HM-TEK Studies		**All Studies**		
Geographic Region	Target	Recommended	Target	Recommended	**Target**	**Recommended**	Difference
Arctic, Kotzebue, Norton Sound	$161.0	$20.0	$81.0	$182.0	**$242.0**	**$202.0**	$40.0
Yukon River	$275.0	$251.0	$138.0	$132.0	**$413.0**	**$383.0**	$30.0
Kuskokwim River	$275.0	$283.0	$138.0	$111.0	**$413.0**	**$394.0**	$19.0
Bristol Bay, Kodiak	$142.0	$134.0	$71.0	$91.0	**$213.0**	**$225.0**	-$12.0
Cook Inlet, Gulf of Alaska	$194.0	$229.0	$97.0	$97.0	**$291.0**	**$326.0**	-$35.0
Southeast	$282.0	$287.0	$141.0	$141.0	**$423.0**	**$428.0**	-$5.0
Inter Regional	$70.0	$78.0	$35.0	$28.0	**$105.0**	**$106.0**	-$1.0
Total	$1,399.0	$1,282.0	$701.0	$782.0	**$2,100.0**	**$2,064.0**	$36.0
Percent of Grand Total	67%	62%	33%	38%			

Figure 2. 2002 Funding Distribution



Recommendations by the Technical Review Committee represent the Draft Resource Monitoring Plan for 2002, and we look forward to gaining input from the Regional Councils and the public.

How to Provide Your Comments

We invite your review and comments on the draft 2002 Fisheries Resource Monitoring Plan. Regional Council members will have an opportunity to review the Monitoring Plan during Council meetings in the fall of 2001.

The Board welcomes your comments by October 31, 2001. These will be compiled along with the Regional Council comments and will be presented to the Board when it meets in December. Written comments may be submitted to:

USFWS Office of Subsistence Management
Attn: Richard Cannon
3601 C Street, Suite 1030
Anchorage, Alaska 99503
telephone: 1-800-478-1456 Fax: 907-786-3898
e-mail: Richard_Cannon@fws.gov

YUKON RIVER REGION OVERVIEW

Issues and Information Needs

Regional Advisory Councils for the Yukon River region have identified many issues and information needs. Much of this interest is centered on the salmon resources, including inseason run assessment in mainstem rivers, distribution and abundance of spawning escapements, and causes for stock declines. There is also substantial interest in the distribution, abundance, and life history of resident fish species. Improved documentation is desired regarding changes in subsistence harvest patterns, and improved use of traditional knowledge is recommended.

Some specific information needs identified by the Regional Advisory Councils were addressed in 2001; the Kaltag-middle Yukon River chinook salmon sampling project and the Pilot Station sonar technology upgrade were both funded by the Office of Subsistence Management.

Chinook, summer chum, and fall chum salmon in the Yukon River drainage are classified as stocks of concern due to low returns in recent years. Both State and Federal agencies declared the Yukon River fisheries a disaster in 2000. For 2001, chinook and summer chum the commercial fishery remained closed, while inseason manager's restricted personal use and sport fishing. Subsistence fishing times and gear for the chinook and summer chum seasons were restricted in various districts over the course of the season. The 2001 fall chum salmon subsistence season started out closed due to low projected returns and was later opened under a normal subsistence schedule based on inseason run assessments.

Expanded communication and coordination among the many interests in the region is needed to better achieve resource stewardship and effective deployment of program funds through coordinated planning. In 2001, OSM funded the Grayling, Anvik, Shageluk and Holy Cross working group to begin to resolve local issues between subsistence and sport harvest groups. Additional funding was provided by OSM to supplement the weekly YRDFA teleconference, keeping communications open between subsistence users and inseason managers.

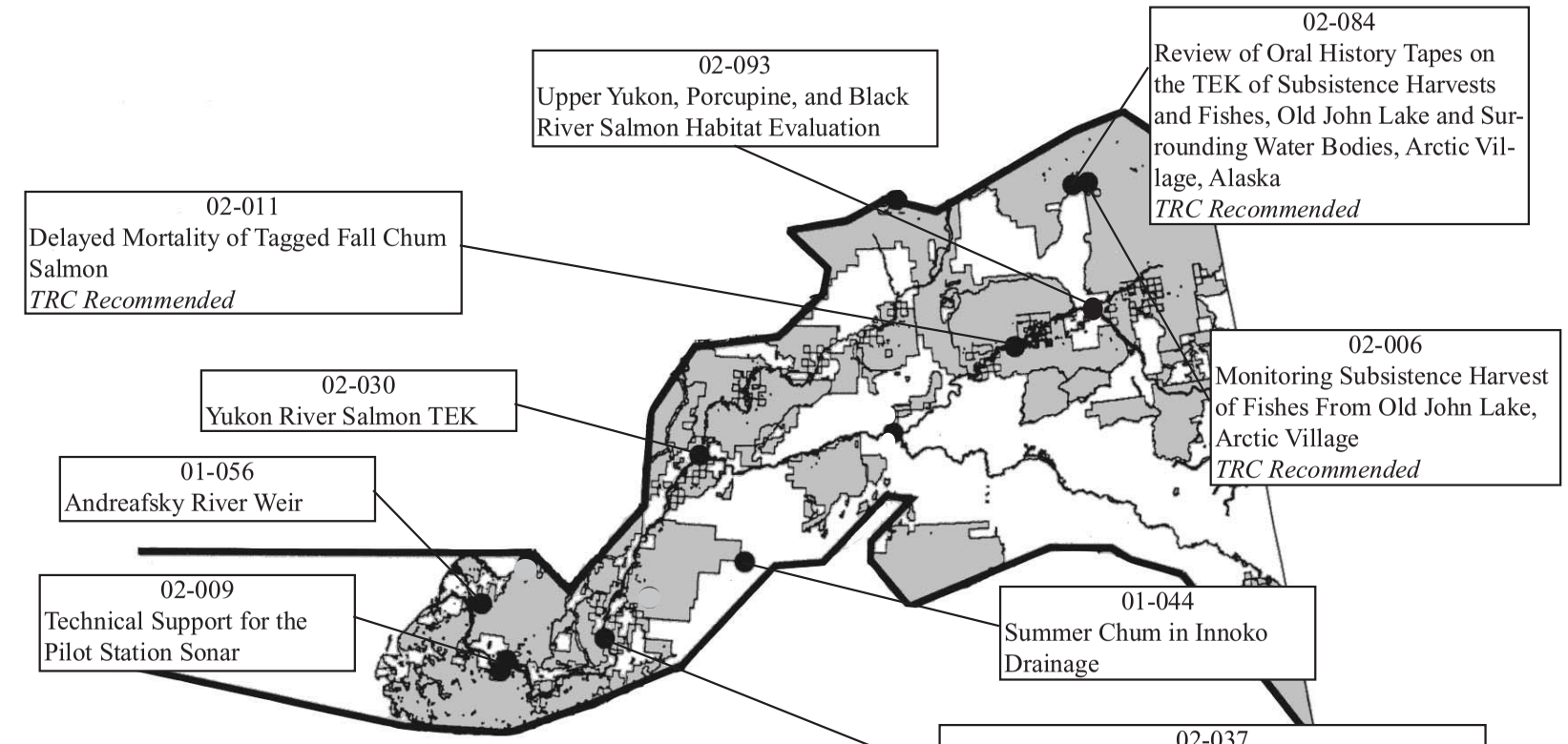
Studies Forwarded for Investigation Plans

There were six projects advanced for Investigation Plan development in the Stock Status and Trends category located throughout the Yukon River Drainage **(Map1)**. These can be organized into 4 general areas of study: *Salmon Main River Run Assessment***;** *Salmon Escapement Surveys*; *Salmon Escapement Weirs and Towers*; and *Salmon Biology Studies*. All of the projects advanced for 2002 funding were salmon studies.

Funding requested for Stock Status and Trends studies totaled approximately $528,789 in FY 2002. The target budget level for the Yukon River Region Stock Status and Trends project category for FY 2002 was $275,000; investigators were encouraged to obtain further in-kind or matching funds to offset the costs of the Subsistence Fishery Monitoring Program.

Map 1. Location of Projects Advanced for Preparation of Investigation Plans

Yukon River Drainage



There were five projects advanced for Investigation Plan development in the Harvest Monitoring and Traditional Ecological Knowledge categories located throughout the Yukon River Drainage **(Map 1).**

Funding requested for Harvest Monitoring and Traditional Ecological Knowledge studies totaled approximately $182,752 in FY 2002. The target budget level for the Yukon River Region Harvest Monitoring and Traditional Ecological Knowledge project category for FY 2002 was $138,000; investigators were encouraged to obtain further in-kind or matching funds to offset the costs of the Subsistence Fishery Monitoring Program.

Table 1, identifies the funding requests by agency and non-government organization for both the Stock Status and Trends and the Harvest Monitoring and Traditional Ecological Knowledge. The local hire and matching funds identified in the investigation plans are reported in **Table 2**.

Selection Process – Stock Status and Trends Projects

The Yukon was found to be an especially challenging area for project selection due to the many program needs, the number of technically sound projects aimed at strategic priorities, and the fact that this is a region of large subsistence use, extensive federal conservation units, and numerous RAC and local concerns, especially with low salmon runs.

The TRC selected a set of projects that met priority needs in a balanced manner, considering program technical needs, including geographic coverage and the importance of local consultation and capacity building.

After careful consideration, the TRC recommended 3 projects in the Yukon River region Stock Status and Trends category for funding in FY 2002 **(Table 3)**. Total FY 2002 cost for the selected projects is approximately $251,239, which is just over 91% of the budget target. Fiscal year 2003 has a smaller target budget, but retains some capacity for new starts. Funding opportunities for new starts will increase significantly in FY 2004 as contracts for multiple year funding mature.

Building on the existing State, Federal and private projects, plus those funded by OSM in 2000 and 2001, the proposed projects for 2002 will improve stock specific information on chinook salmon and main river run assessment for fall chum salmon in the Yukon River Drainage.

- The Delayed Mortality of Tagged Fall Chum Salmon project (02-011) answers serious questions about the delayed mortality rates due to handling stress of fall chum salmon captured at fish wheels operated by the Rampart Rapids tagging study. Results of the study will provide manages with more information to better asses the impacts of handling stress from fish wheel operation and various holding times on salmon stocks. (The Office of Subsistence Management is currently funding the Rampart Rapids tagging study (01-032), which has been an important tool for inseason managers to asses run strength, provide for upriver spawning escapement and subsistence fishery management.)

Table 1.

FY 2002 Yukon River Projects

Region 2. Yukon River

Type A . Stock Status & Trends

Doc #	Agency/Org	Title	NGO $	Fed$	State $	Total $
01-044	USFWS	Chinook and Summer Chum Salmon Distribution in the Innoko River Drainage	$0.00	$135,000.00	$0.00	$135,000.00
01-056	USFWS, Andreafsky/Algaciq,	Abundance and run timing of adult salmon in the North Fork Andreafsky River, Yukon Delta National Wildlife Refuge, Alaska.	$32,659.00	$89,891.00	$0.00	$122,550.00
02-009	AVCP	Pilot Station Sonar Technician Support	$20,000.00	$0.00	$0.00	$20,000.00
02-011	USFWS	Abundance and Handling Mortality of Fall Chum Salmon in the Yukon River above the Tanana River, Alaska, 2001	$0.00	$45,000.00	$0.00	$45,000.00
02-094	ADFG-CFD	Run timing and migratory patterns of chinook salmon stocks within the Yukon River using allozyme and DNA markers	$0.00	$0.00	$108,999.00	$108,999.00
02-096	USFWS, ADFG-CFD, PBS, Tribal	Yukon River Chinook Stock Specific Harvest Information	$55,900.00	$74,000.00	$3,000.00	$132,900.00
02-097	USFWS, U Idaho	Sex-ratios of juvenile and adult chinook salmon in the Kuskokwim and Yukon Rivers.	$3,108.00	$10,500.00	$0.00	$13,608.00
02-121	ADFG-SFD, ADFG-CFD, USFWS, CDFO, YRDFA, AVCP	Run timing, migratory timing, and harvest information of chinook salmon stocks within the Yukon River	$49,040.00	$68,000.00	$75,591.36	$192,631.36
Total			$160,707.00	$422,391.00	$187,590.36	$770,688.36

Table 2.

FY 2002 Local Hire and Matched Funds Report Yukon River

Region **2. Yukon River**

Type **A . Stock Status & Trends**

Doc #	Agency/Org	Title	Local Hire $	Matched $
01-044	USFWS	Chinook and Summer Chum Salmon Distribution in the Innoko River Drainage	$10,000.00	$52,000.00
01-056	USFWS, Andreafsky/Alg aciq,	Abundance and run timing of adult salmon in the North Fork Andreafsky River, Yukon Delta National Wildlife Refuge, Alaska.	$22,216.00	$0.00
02-009	AVCP	Pilot Station Sonar Technician Support	$20,000.00	$0.00
02-011	USFWS	Abundance and Handling Mortality of Fall Chum Salmon in the Yukon River above the Tanana River, Alaska, 2001	$36,000.00	$100,000.00
02-097	USFWS, U Idaho	Sex-ratios of juvenile and adult chinook salmon in the Kuskokwim and Yukon Rivers.	$3,000.00	$10,188.00
02-121	ADFG-SFD, ADFG-CFD, USFWS, CDFO, YRDFA, AVCP	Run timing, migratory timing, and harvest information of chinook salmon stocks within the Yukon River	$18,000.00	$145,000.00
Total			$109,216.00	$307,188.00

Type **B. Harvest Monitoring/TEK**

Doc #	Agency/Org	Title	Local Hire $	Matched $
02-006	USFWS, AVTC, ADFG-SD	Subsistence harvest of freshwater fish from waters near Arctic Village, Arctic National Wildlife Refuge, Alaska	$0.00	$12,856.98
02-030	YRDFA, ADFG-SD	Yukon River Salmon Traditional Ecological Knowledge	$15,000.00	$0.00
02-037	ADFG-SD, TCC	Harvest monitoring of subsistence non-salmon fish in the lower Yukon River	$0.00	$0.00
02-084	USFWS, AVC, ADFG-SD	Review of Oral History Tapes on the Traditional Ecological Knowledge of Subsistence Harvests and Fishes, Old John Lake and surrounding water bodies, Arctic Village, Alaska	$10,445.00	$7,091.00
Total			$25,445.00	$19,947.98
Grand Total			$134,661.00	$327,135.98

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Table 3. Proposed selection of FY 2002 Yukon River stock status and trends investigation plans for consideration. Proposed selections are shown with bold type and noted with a "Yes" in the "Selection" column.

			Requested Budget		
FIS#	Title	Selected	2002	2003	2004
	Salmon Main River Run Assessment				
02-009	Technician Support for the Pilot Station Sonar	No a	$20.0		
02-011	**Delayed Mortality of Tagged Fall Chum Salmon**	**Yes** *b*	**$45.0**		
	Salmon Escapement Surveys				
01-044	Summer Chum in Innoko Drainage	No	$135.0	$114.0	$116.2
	Salmon Escapement Weirs and Towers				
01-056	Andreafsky River Weir	No	$122.6	$58.9	$58.6
	Salmon Biology Studies				
02-121	**Run Timing, Migratory Patterns, and Harvest Information of Chinook Salmon Stocks within the Yukon River**	**Yes** c	**$192.6**	**$192.7**	**$178.7**
02-097	**Sex-ratios of juvenile and adult chinook salmon in the Kuskokwim and Yukon Rivers**	**Yes** *d*	**$13.6**	**$7.5**	
	GRAND TOTALS		$528.8	$365.6	$353.5
	TARGET BUDGET LEVELS		$275.0	$262.9	$669.9
	PROPOSED SELECTIONS		**$251.2**	**$200.2**	**$178.7**

a This would fund another year of the same activities conducted under study 01-018.

b This study reached the investigation plan stage in 2001 as 01-063. The original funding request was for two years, but the Technical Review Committee recommend funding for one year.

c As reviewers suggested, proposals 02-094 and 02-096 were merged into a single investigation plan 02-121 with investigators working as partners to accomplish this work.

d This study was originally placed within the Inter-Regional category, but was moved into Yukon River based on study area and budgetary considerations.

- Project 02-121, Run Timming, Migratory Patterns, and Harvest Information of Chinook Salmon Stocks Within the Yukon River, is a collaborative project between ADF&G, USF&WS and the Canadian DFO; the project will develop a Yukon River basin-wide DNA genetics baseline for chinook salmon. The genetics baseline from samples collected in the U.S. and Canada will give managers additional information on run timing and migration patterns of chinook salmon in the Yukon River.

- The third project recommended for funding will look at skewed sex- ratios in chinook salmon returning to spawn in tributaries of the Yukon and Kuskokwim Rivers. Project 02-097, Sex-ratios of Juvenile and Adult Chinook Salmon in the Kuskokwim and Yukon Rivers, will look at genotypic and phenotypic sex ratios in adult and juvenile salmon to identify possible causes for the low numbers of females returning to spawn.

Projects not selected for funding recommendation include work that would be of significant benefit. It is hoped that cost sharing through the development of new partnerships and the identification of alternative funding sources may allow these projects to go forward. We would recommend that projects advanced to the investigation plan stage, but not funded, be resubmitted for consideration in 2003.

Selection Process – Harvest Monitoring and TEK Projects

The Yukon River Advisory Councils have identified information needs for Harvest Monitoring and Traditional Ecological Knowledge in the Yukon River Region. Given the recent declines in salmon runs and the restrictive harvest regulations, information on the subsistence harvest of non-salmon species was identified as a priority.

The TRC recommended 3 projects in the Yukon River region Harvest Monitoring and Traditional Ecological Knowledge category for funding in FY 2002 **(Table 4)**. No investigation plan was received for project 02-093 and the project was considered withdrawn by the TRC. Total cost of projects proposed for funding in FY 2002 was approximately $132,397, which was 96% of the budget target.

- Project 02-006, Subsistence Harvest of Freshwater Fish From Waters Near Arctic Village, Arctic National Wildlife Refuge, Alaska, will monitor subsistence harvest of fish from waters near Arctic Village. This project addresses local concerns about declining harvests and builds upon the data collected in project 01-011, funded by OSM in FY 2001.

- Project 02-084, the Review of Oral History Tapes on the Traditional Ecological Knowledge of Subsistence Harvests and Fishes, Old John Lake and Surrounding Water Bodies, Arctic Village, Alaska, will record historical subsistence information on utilization and ecology of the fish in Old John Lake and surrounding waters. This project

Table 4. Proposed selection of FY 2002 Yukon River harvest monitoring and Traditional Ecological Knowledge investigation plans for funding consideration. Proposed selections are show with bold type, and noted with a "Yes" in the "Selection" column.

			Requested Budget		
FIS #	Title	Selected	2002	2003	2004
02-030	Yukon River Salmon Traditional Ecological Knowledge	No	$50.3	$50.4	
02-037	**Harvest monitoring and Traditional Ecological Knowledge of Subsistence Non-Salmon Fish in the lower Yukon River**	**Yes**	**$60.1**	**$120.2**	**$58.8**
02-084	**Review of Oral History Tapes on the Traditional Ecological Knowledge of Subsistence Harvests and Fishes, Old John Lake and surrounding water bodies, Arctic Village, Alaska**	**Yes** *a*	**$25.6**		
02-093	Upper Yukon, Porcupine, and Black River Salmon Habitat Evaluation	No *b*	$105.2		
02-006	**Monitoring subsistence harvest of fishes from Old John Lake, Arctic Village**	**Yes** *c*	**$46.7**		
	GRAND TOTALS		$287.9	$170.6	$58.8
	TARGET BUDGET LEVELS		$138.0	$317.1	$334.6
	PROPOSED SELECTIONS		**$132.4**	**$120.2**	**$58.8**

a This would fund another year of activities conducted under study 01-003
b Withdrawn from further consideration by Technical Review Committee. Investigation plan not submitted.
c This would fund another year of activities conducted under study 01-011.

will expand on the data collected in project 01-003, funded in FY 2001 by OSM and is a companion project to projects 01-011 and 02-084.

- The third project 02-037, Harvest Monitoring of Subsistence Non-Salmon Fish in the Lower Yukon River is a 3-year project quantifying the increased harvest of non-salmon fish due to poor salmon runs. This project addresses local concerns on the impacts of increased harvest of non-salmon fish and will collect harvest and TEK data in the communities of Grayling, Anvik, Shageluk and Holy Cross.

All of the projects recommended address important issues identified by the Yukon Kuskokwim Delta Subsistence Regional Advisory Committee and employ sound scientific methods. The projects involve a wide group of partnerships with villages such as Arctic Village, and with regional organizations such as TCC, who share major responsibilities for the projects. The projects are distributed on the upper and lower Yukon drainage.

Funding Recommendation Summary

Six studies, three Stock Status and Trends studies and three Harvest Monitoring and Traditional Ecological knowledge studies were recommended for funding by the TRC, the total combined costs of the projects is $383,637 in FY 2002. The allocation of the funding among non-government organizations, state and federal and is depicted in Figure 2. Approximately 27% of the funding would go to non-government organizations, 35% to state agencies and 39% would go to federal agencies. Local hires account for approximately 16% of the total funding request and the investigators would contribute over $130,135 in matching funds **(Table 2)**.

Investigation plans not recommended for funding in FY 2002 will not automatically be considered in 2003. It will be the responsibility of the investigators to annually resubmit appropriate investigation plans for consideration in future funding cycles.

Study Recommendations, Descriptions, and Justifications

Additional details about each project can be found in the sections that follow. For each project, we have included the Technical Review Committee recommendation, a project description, and the technical justification for the recommendation.

Study information is organized into two sections. The first contains Stock Status and Trends studies information, while the second contains Harvest Monitoring and Traditional Ecological Knowledge studies information. Within each section, studies are organized by their assigned numbers, in increasing order.

Not Recommended For Funding

01-044
Innoko River Chum and Chinook Salmon Radio Telemetry Project

Investigator(s): USF&WS, Fairbanks Fishery Resource Office (Randy Brown), and the Innoko National Wildlife Refuge

FY2002 Budget: $ 135,000.00

Total Budget (3): $ 385,000.00

Geographic Area: Yukon

Information Type: SST

Issues:

The Innoko River drainage harbors spawning populations of at least three species of Pacific salmon. However, fisheries work in the drainage to date has been minimal, and very little is known about spawning areas, the distribution of spawning fish within the drainage, or the magnitude of escapement of salmon in the drainage.

Objectives:

1) Capture and place radio tags on chum and chinook salmon during June and July in the lower Innoko River
2) Track the upstream movements and tributary destinations of radio-tagged salmon with a network of remote, data-logging, receiving stations
3) Estimate the proportional distribution of chum salmon among Innoko River tributaries
4) Conduct aerial surveys of the drainage to identify major spawning areas for chum and Chinook salmon

Methods:

Chum and Chinook salmon will be captured, radio-tagged, and tracked to spawning destinations in the Innoko River drainage. Constantly monitored set and drift gillnets will be used to capture fish in the Innoko River downstream from the Iditarod River mouth. The timing of the chum and Chinook runs into the Innoko River has never been described. However, a representative sample of fish from the entire run is expected with sampling beginning in mid-June and continuing until mid- to late-July. Captured fish will be placed in a water-filled tub for tagging. Each candidate fish will receive a radio-tag that will be pushed through the mouth and into the stomach. No anesthesia is needed for this method of tagging. Two hundred radio transmitters will be deployed on chum salmon, and up to 100 Chinook salmon will be tagged opportunistically when they are captured. Fish will be released immediately following tagging. Upstream movements of

tagged fish will be monitored with remote receiving stations located at critical junctures in the drainage. This data alone will allow a determination of tributary destination of all fish. Proportional distribution of chum salmon among the Innoko River tributaries will be estimated. Three comprehensive aerial surveys will be conducted in the tributaries to locate spawning areas. The first survey will begin about two weeks after tagging begins, and the other two surveys will follow at two-week intervals. This staggered schedule will ensure that fish are located at least once on actual spawning locations, rather than following spawning when they might have drifted downstream some distance. Ideally, this process will be repeated three years consecutively to describe inter-annual variability.

Products:

An annual progress report will be written each fall following project completion, and a comprehensive scientific report will be prepared after the third year. The reports will be prepared by the USF&WS, Fairbanks Fishery Resource Office. They will be distributed by January 31 to the Office of Subsistence Management, Fishery Information Service, and to other interested parties.

Experience of Investigators:

The staff of the U.S. Fish and Wildlife Service, Fairbanks Fishery Resource Office, has a wide range of professional expertise and experience in Alaska fisheries work. Randy J. Brown, a fisheries biologist with the Service, will be the principle investigator of this project, with the administrative and technical support of the office behind him. He has worked for five years on fisheries radio telemetry projects in the Yukon River drainage, conducting work with chum and Chinook salmon, sheefish, and humpback whitefish. During 2001, he traveled to the Innoko River with John Burr of ADF&G, where they conducted a pilot radio telemetry study demonstrating the feasibility of the proposed work.

Partnerships/Collaboration:

As conceived, this project will be a cooperative effort between several agencies and many individuals. The Fairbanks Fishery Resource Office will be the lead agency in planning and operations. The Innoko NWR will be providing logistic and material support in the form of transportation, boats, fuel, food, camp supplies, and other items. The Alaska Department of Fish and Game and the National Marine Fisheries Service will be coordinating radio transmitter purchases to ensure compatibility with their larger tagging operation of Chinook salmon and their receiving station network in the Yukon River. And the capture and tagging of candidate fish in the lower Innoko River will include a biologist from the Fairbanks Fishery Resource Office and two fisheries technicians, preferably interested individuals from villages in the region. Project plans and progress reports will be distributed to regional village councils.

Justification:

The Yukon River Region, Regional Advisory Councils, specifically identified the need for information on the abundance and distribution of salmon in the lower Yukon and the contribution

of clearwater streams in this region to overall production. The need for baseline information from the Innoko River is also identified in the Yukon River Comprehensive Plan for Alaska (ADF&G 1998). This project would use radio telemetry to address the need for information on the use, distribution and proportion of chinook and summer-run chum salmon in the tributaries of the Innoko River. Subsistence use of fish stocks in the lower Yukon is substantial and without baseline information on spawning aggregations within the watershed, overuse of specific stocks could compromise long-term sustainability. Funding was provided in FY 2001 (FIS 01-048) to identify potential sites for a resistance-board weir in the Innoko River drainage. Project 02-005, Abundance and Run Timing of Adult Salmon in the Innoko River would fund a resistance-board weir project within the drainage. This project was recommended for resubmission in 2003. Information collected by this project would assist in the selection of an appropriate weir location.

Project objectives are clear and achievable. And the analysis seems appropriate for the scope of work. The principal investigator for the project has the demonstrated ability to complete the project. The Fairbanks FRO and the Innoko NWR will provide significant matching funds.

Initial consultations have been made with ADF&G, a representative of the Tanana Chiefs Conference (Anvik, Grayling, Holy Cross and Shagaluk) and the Tribal administer for the Shagaluk Tribal Council. The project also allows for the hiring and training of two local residents. The dissemination of information to local communities is mentioned but unclear in the proposal. The clarification and identification of opportunities for local involvement and sharing of information with regional subsistence groups would strengthen this aspect of the investigation plan.

The P.I. addressed TRC concerns over budget amount and scope of work in the original IP. This project addresses an important regional information need and was given a high priority for funding by the TRC. Unfortunately budget constraints severely limited the number of new starts OSM was able to fund in 2002. The P.I. is encouraged to seek alternative funding sources or resubmit the proposal during the 2003 funding cycle.

Not Recommended For Funding

01-056
Abundance and run timing of adult salmon in the Andreafsky River, Yukon Delta National Wildlife Refuge, Alaska

Investigator(s): Kenai Fishery Resource Office, U.S. Fish and Wildlife Service; Algaaciq Tribal Government; Yupiit of Andreafsky

FY2002 Budget: $ 122,550.00

Total Budget (3): $ 239,582.00

Geographic Area: Yukon

Information Type: SST

Issues:

Current monitoring efforts of valuable subsistence fishery resources are inadequate to provide all Yukon River subsistence users their necessary harvest quota. Improving/increasing the escapement monitoring projects within the drainage would help ensure that subsistence harvests needs are met.

Objectives:

1) To count daily salmon passage through the weir between June 20 and August 1.
2) To estimate the weekly age and sex composition of escapement.
3) To determine Chinook, chum and pink salmon run timing into the North Fork of the Andreafsky River.
4) To provide federal managers, ADF&G, and the Yukon River Drainage Fisheries Association with daily fish count information, which will assist in timely management decisions.

Methods:

A floating weir will be built in Bethel with project oversight by USFWS personnel. Personnel from the village of St. Mary's will assist with the construction and installation. The weir will be installed approximately 20 miles upriver of the Andreafsky River mouth, and operated annually from mid June to mid August. The weir will provide accurate counts of chinook, chum, pink and sockeye salmon escapements.

Deliverables/Products:

Daily fish passage counts will be provided to the Yukon River Drainage Fisheries Association, ADF&G, and the U.S. Fish and Wildlife Service. Biological data (age, sex, and length

composition) will be available for all salmon species passing the fish weir. Annual reports will be prepared and delivered to all cooperators and management agencies.

Experience of Investigator(s):

Principal investigator Kenai FRO, has experience in construction, mobilization, accounting and reporting of fishery projects including fish weir operations (Tobin 1994). Weir construction and operation has included the East Fork Andreafsky River fish weir 1994-2000 (Tobin and Harper 1995,1996,1997,1998); Tuluksak River fish weir 1991-1994, (Harper 1998); and the Kwethluk River fish weir (1992 and 2000 Harper1998, Harper and Watry in prep). As knowledge has been acquired through continuing operations, modifications have been incorporated to improve efficiency, consistency, and data collection. The Kenai FRO has provided assistance to the Kuskokwim Native Association and ADF&G with a potential site location in the Aniak River. The Kenai FRO at the Andreafsky weir has provided seasonal personnel from the Native Village of Quinhagak and the Department training over the past several years.

Partnerships/Collaboration/Consultations:

Consultations have been ongoing between the U.S. Fish and Wildlife Service, Nerklikmuit and Algaciq native associations, Bering Sea Fisheries Association, and the Association of Village Council Presidents. A weir has been in place on the East Fork of the Andreafsky River since 1994 with concurrence of all the aforementioned parties. There are opportunities for capacity building during the construction, installation and operation through cooperative agreements. Since 1994, at least three local village personnel have worked at the East Fork weir site from June through August, and sometimes later into September.

Justification:

Since 1994 the St Mary's residents have operated a weir on the east fork of the Andreafsky River. Currently the East Fork Andreafsky River Weir (FIS 01-026) is being funded through the Subsistence Fishery Monitoring Program. Aerial survey counts in the two forks of the Andreafsky River have not been highly correlated. The proposed project would place an additional weir on the North Fork Andreafsky River to provide additional information on the seasonal escapement of salmon in the Andreafsky River. This information would aid in-season managers in meeting escapement and subsistence priority goals. The Regional Council from this area listed this weir project as an important information need.

The study objectives are clear and achievable and the methods section was very detailed and complete. Comments provided during the review of the pre-proposal identified concerns over the budget that were addressed in the investigation plan. The partnership and capacity building aspects of this project are good, developing partnerships between the U.S. Fish & Wildlife Service and the Algaciq and Andreafsky Tribal Councils. In the investigation plan both rural groups will be directly involved in the collection of escapement data as well as administering a portion of the proposed budget.

This project identified a recognized information need but was not prioritized by the TRC high enough to fall within the budget target for FY 2002. The Office of Subsistence Management currently funds the East Fork Andreafsky River weir, which collects information on salmon escapement within the watershed. Given the current budget constraints the TRC felt the information needs outside the Andreafsky River were higher priorities. Investigators are encouraged to continue to seek alternative funding sources. The Bearing Sea Fisherman's Association is one possible source as they previously supported the weir project on the East Fork.

Not Recommended For Funding

02-009
Pilot Station Sonar Technician Support

Investigator(s): Association of Village Council Presidents

FY2002 Budget: $ 20,000.00

Total Budget (1): $ 20,000.00

Geographic Area: Yukon

Information Type: SST

Issues:

The investigator will hire a local resident from the community of Pilot Station to assist the ADF&G in any and all sonar operations for the 2002 field season. This will add capacity to the local tribal and village community and offer employment in a region where few jobs are available.

Objectives:

1) To hire and train a local village member knowledgeable of the area to be placed on staff to a large, on-going project.
2) To continue to strengthen the existing relationships between the ADF&G, AVCP, and the local tribal office and community.
3) To provide economic opportunity for the community.
4) To extend the work period by approximately four weeks, so as to discourage the need for the ADF&G to conduct an emergency hire late in season.
5) To further support and strengthen existing capacity building operations and to work at broadening links with the local entities for future possibilities.

Methods:

VCP will work with the local tribal office and ADF&G to begin the job opening, (if necessary) hire and then train the technician chosen. The technician will work on or about June 1, 2002 through September 13, 2002. This work schedule is approximately four weeks longer than as in years past. This is due to a request from the previous ADF&G Regional Sonar Supervisor, and crosses out the need for any emergency hires that might have been necessary, towards the end of the season.

Deliverables/Products:

AVCP will write up a report, which will describe the technician hired, dates of employment and hours worked. The report will also describe the technician's involvement in project operations

and any skills he/she may have developed over the course of the season. The different organizations involved with this project will also be described.

Experience of Investigator(s):

Jennifer Hooper, the principle investigator, has worked for the ADF&G as a FWT II and is familiar with many of the requirements and duties to be performed. AVCP has been successful in providing local-hired technicians for projects in the past. Technician support has been supplied to the Aniak River sonar, the Kwethluk River counting tower, the Pilot Station sonar and the Marshall test fishery.

Partnerships/Collaboration/Consultations:

One of AVCP's goals is to get local people interested and involved in all arenas possible. With respect to employment opportunities we strive first for local hire and include the local tribal offices in all instances possible. This may include working with them to hire a local person or by contracting with them to hire and pay that local person.

For each new season/RFP's for an existing project (or even a new one) the AVCP Natural Resources Department makes an effort to contact the appropriate tribal council office and asks for their input, as well as whether they would like to apply themselves or for if they want AVCP to continue to seek funding. My goal, as the Director of Natural Resources, is for them to eventually become comfortable enough in their own operations, that they will want to submit proposals on their own, for themselves.

This particular project continues a strong, existing relationship between AVCP, ADF&G and the local tribal office, and the community. The technicians hired by AVCP have come back year after year, making their training on going, while building their capacity as fisheries technicians. They gain the knowledge and expertise with their on-the-job training, which then makes these technicians valuable and highly competitive if they were to ever enter the job market in a fisheries-related field.

Justification:

This work supports operation of Pilot Station sonar, operated by Alaska Department of Fish and Game, as well as local training and employment, by providing funding to hire a village resident to serve as part of the sonar field crew. Alaska Department of Fish & Game supports the proposal of the technician position (Carl Pfisterer pers. comm.). Funding to hire a village resident for Pilot Station Sonar was provided last year through study FIS 01-018. Partnership and capacity development is the main strength as well as the primary objective of this proposal.

Based on last year's TRC comments and this year's review, this could be further improved by development of clearer training goals and objectives for the position. The TRC was concerned that the comments were not addressed in the 2002 investigation plan. ADF&G's decision not to keep Pilot Station sonar operating through the coho salmon run in 2001 brings into question

the fourth objective of this Investigation plan, which is to provide technician support through mid-September. Although the capacity building component of the project is good the TRC did not rank the proposal high enough to fall within the budget target for FY 2002. Funding from the Partners for Fisheries Monitoring Program will be available in 2002 and may better address the capacity development needs at Pilot Station.

Recommended For Funding

02-011
Delayed Mortality of Tagged Fall Chum Salmon

Investigator(s): Division of Fishery Resources, U.S. Fish and Wildlife Service; Fairbanks Fishery Resource Office, U.S. Fish and Wildlife Service

FY2002 Budget: $ 45,000.00

Total Budget (2): $ 90,000.00

Geographic Area: Yukon

Information Type: SST

Issues:

Handling mortality became an issue when the U.S. Fish and Wildlife Service reported reduced marked to unmarked ratios in areas above the tagging site. Marked to unmarked ratios were reduced as distance increased from the tagging site. Eight of nine potential hypotheses explaining the trend were discounted after examination of available data. A hypothesis of delayed mortality was consistent with the available data, and is considered the most likely causal factor.

Objectives:

1) Estimate the absolute abundance of fall chum salmon in the mainstem Yukon River upstream of the Tanana River confluence.
2) Estimate the relative increase in mortality of fall chum salmon caused by holding fish in a fish wheel live-box and by capturing fish multiple times in fish wheels.
3) Estimate the mortality of fall chum salmon caused by holding fish in a fish wheel live-box and by capturing fish multiple times in fish wheels.
4) Estimate the weekly sex and length composition of fall chum salmon.

Methods:

Using marked fall chum salmon from an on going tagging project at the Rampart-Rapids, the funds requested provide an additional fish wheel for recovery of tagged fish at either Beaver or Circle, Alaska in 2002 and 2003.

Deliverables/Products:

Daily reporting of catch-per-unit-effort to ADFG. Annual submissions to the Joint Technical Committee Annual Report, Final technical report via the U.S. Fish and Wildlife Technical Report Series.

Experience of Investigator(s):

The lead agency for this project is the USFWS, as represented by the Region 7 Regional Office and the Fairbanks Fishery Resource Office (FFRO). The FFRO has been conducting fishery field investigations for almost 2 decades.

Jeff Bromaghin, Co-principle Investigator, has worked as a fishery statistician since 1990. He has a B. S. degree in Wildlife Management and M. S. and Ph.D. degrees in statistics.

Tevis Underwood, Co-principle Investigator, has been a staff biologist at the FFRO since 1990. He has a Bachelor and Master degrees in biology and fisheries resources as well as 14 years professional experience as a Fishery Biologist with the USFWS. Tevis has conducted several large-scale projects in northern Alaska for which technical reports and some peer-reviewed articles are available. These projects include completion of a multi-year investigation of the near shore waters of the Arctic National Wildlife Refuge and a population study on Sheefish spawning in the Selawik River. He began leading his current project, the Rampart-Rapids Tagging Study in December 1996. Included in his list of publications are four peer reviewed articles and 14 technical reports that he has authored or coauthored.

Partnerships/Collaboration/Consultations:

This project provides the potential to work with rural residents and villages to provide local employment and involvement. Inquires have been made in Stevens Village, Beaver, and Circle regarding fish wheel operators and the availability of rural residents to fulfill data gathering. We intend to contract at least one additional fish wheel and people to work five days a week to run the fish wheels. Fish and Wildlife Service would be the lead agency and provide weekly technical oversight and assistance.

Justification:

The Investigation plan addresses the conservation issue of delayed mortality due to handling stress for fall chum salmon sampled at the Rampart Rapids fish wheels. Significant subsistence use occurs above the project site. The Rampart Rapids project is an important tool for in-season managers to regulate subsistence harvest and Canadian boarder escapement goals. The 2000 operation of the project was stopped in mid-season due to week returns and concerns of increased mortality associated with handling stress from the project. Data up to that point in the run in 2000 was confirming down-river assessment tools and was critical to in-season management decisions that year. Currently the Rampart Rapids Tagging Study (FIS 01-032) and the Rampart-Rapids Tagging Extension (FIS 01-177) are being funded through the Subsistence Fishery Monitoring Program. The Rampart-Rapids Tagging Extension Project addresses handling mortality through the reduction of handling times and is scheduled to be on-line in the fall of 2001.

The main objective of this study is to quantify the effects of handling and holding salmon relative to long range migration survival. The study design will allow for a more accurate estimate

of relative mortality caused by holding fish under a suite of conditions. The budget seems appropriate for the operation of additional fish wheels needed to obtain the relative mortality data.

Principal investigators for the project have a proven track record in fisheries research. Consultations were made with Stevens Village, Beaver and Circle, regarding interest in participation in the project. The project will fund the operation of at least one fish wheel and a crew to operate the wheel five days a week.

The TRC identified the strategic need and regional importance of resolving this issue. The project was initiated in 2001 without OSM funding. The original funding request was for 2 years, the TRC recommends funding the project for one year and requests an opportunity to review the 2001 results.

Recommended For Funding

02-097
Sex-ratios of Juvenile and Adult Chinook Salmon in the Kuskokwim and Yukon Rivers

Investigator(s): Fish Genetics Laboratory, U.S. Fish and Wildlife Service; Kenai Fishery Resources Office, U.S. Fish and Wildlife Service; Fairbanks Fisheries Resources Office, U.S. Fish & Wildlife Service; King Salmon Fishery Resources Office, U.S. Fish and Wildlife Service; Department of Biological Sciences, University of Idaho

FY2002 Budget: $ 13,608.00

Total Budget (2 years): $ 21,108.00

Geographic Area: Yukon

Information Type: SST

Issues:

Skewed sex-ratios have been noted at weirs in several tributaries of the Kuskokwim and Yukon Rivers with low proportions of females returning to spawn (Tuluksak River 1991-1994 average 20%, range 14-29%; Kwethluk River 1998 & 2000, average 23%; Gisasa River 1994-2000 average 30%, range 17-42%). It is unclear whether the sex ratio is skewed due to environmentally-influenced sex-inversion during embryo development, differential survival (including selective harvest), or other, as yet unknown reasons.

Objectives:

1) Compare the genotypic and phenotypic gender of adult chinook salmon returning to the Tuluksak, Kwethluk and Gisasa Rivers and Big Creek.
2) Estimate the genetic sex ratio of year 1+ chinook salmon juveniles from those same drainages.
3) Examine gonads isolated from 100 juvenile chinook salmon for the presence of intersex development.

Methods:

A fin clip will be collected from at least 400 returning adult Chinook salmon at weirs on the Tuluksak, Kwethluk and Gisasa Rivers and Big Creek. Phenotypic sex, length and age data for these fish will be collected as part of the weir project. Fin clips will also be collected from juvenile Chinook salmon at ten sites approximately evenly spaced within each drainage over as narrow a time frame as is logistically possible. For evaluation of intersex (gonads developing with both testicular and ovarian tissue), 100 juvenile Chinook salmon will be sacrificed and the developing gonads will be collected.

DNA isolated from the fin clip samples will be analyzed to determine whether a male-specific Y-chromosome genetic marker is present. The presence of the marker will indicate that fish was genetically a male, absence will indicate it was genetically a female. The genotypic and phenotypic sex determinations for each adult fish will be compared to determine if sex-reversal is occurring. The presence/absence of intersex will be evaluated by histological examination of the developing juvenile Chinook salmon gonads.

Deliverables/Products:

A final report will document the results of this study and be submitted to the Office of Subsistence Management, Fisheries Information Services Division by September 30, 2003. The genetic data will be available as an electronic file; tissue samples and DNA will be archived for future use.

Experience of Investigator(s):

The USFWS Fish Genetics Laboratory is composed of a molecular biologist, a population geneticist, a fisheries biologist and several biological technicians and works in close collaboration with a biometrician. Lab personnel have a long history of conducting population genetic studies on fish. Wally Buchholz, the lead investigater on this project has over 20 years experience in molecular biology and has developed and optimized the types of molecular tools required for this study. Ken Harper, Kevin Van Hatten and Kellie Whitten are all trained fisheries biologists and have years of experience in Alaskan fisheries. Jim Nagler has over 10 years studying sex hormones in fish and has recently published on abnormal sex-ratios in Columbia River chinook salmon.

Partnerships/Collaboration/Consultations:

Field collections will be obtained by local hires who are employed at the weir sites. Training in tissue collection will be provided to these employees, with the objective of them developing the skills necessary to lead such efforts in the future. The USFWS Fish Genetics Laboratory will perform genetics work and analyses. Opportunities to assist in the genetics laboratory will be made available to qualified college interns from Kuskokwim River communities.

Justification:

This proposal is interesting in tackling a difficult subject and applying a novel approach via technology and experimental design to identify possible causal mechanisms behind sex ratios observed in chinook salmon. This topic has been raised for a long time and has important ramifications for the setting of BEGs and the management of escapement.

The aberrant sex ratios of various chinook populations that are described in this proposal would seem to be an important concern with respect to the general health of these populations and their declining abundance. These concerns are clearly identified and the geographic scope of the

apparent problem is described in the proposal. While it seems doubtful that the present situation is (or may be) cause for concern regarding reduced genetic diversity in or among the affected populations (given their apparent present abundances), such strongly skewed sex ratios are still a valid reason for concern and justify research to determine their underlying cause(s).

The proposed use of the OtY1 gene for genotypic sex determination should provide a reliable marker for the genotyping portion of the study. Having a subset of samples independently analyzed in the second genetics lab is a good QC step. Similarly, analyzing a subset of samples for the growth hormone pseudogene (with the associated GH1 and GH2 genes serving as positive controls) is an additional strength of the experimental design.

Recommended For Funding

02-121
Genetic Diversity, Run Timing, and Migratory Patterns of Chinook Salmon Stocks Within the Yukon River

Investigator(s): Gene Conservation Laboratory, Alaska Department of Fish and Game; Fish Genetics Laboratory, U.S. Fish and Wildlife Service; Pacific Biological Station, Department of Fisheries and Oceans, Canada

FY2002 Budget: $ 192,631.36

Total Budget (3 years): $ 564,030.00

Geographic Area: Yukon

Information Type: SST

Issues:

Chinook salmon from the Yukon River have experienced weak to below average returns over the last last four(?) years, and in the 2000 seasonthree years. Escapements in 2000 were the poorest since statehood, with annual aerial escapement goalswere generally not achieved only with the exception ofin the Anvik and Salcha Rivers. Data on exploitation rates and returnss appear to vary significantly among populationsYukon River stocks. Although scale pattern analysis provides generic some stock identification information However, little population-specific information is available on the run-timing and migratory patterns of chinook salmon as they enter and migrate in up the YukonYukon River. This project will establish a genetic baseline using nuclear DNA markers (microsatellites and single nucleotide polymorphism-SNPs) and as well as evaluate several newer advanced statistical approaches that have been developed forpotentially highly variable DNA markers. In addition, using non-lethal sampling we will utilize and build on the existing allozyme database to more accurately and precisely identify specific populations harvested in complex mixturesmixed stock fisheries. The enlarged database will be used to estimate the composition of mixtures mixed stocks in varying time and geographic strata. This information will increase our understanding of run timing of entry and migration patterns of chinook salmon in the Yukon River, aid in run reconstruction of chinook salmon for US/Canada Treaty negotiations and subsistence harvest, and may revealincrease opportunities for subsistence and commercial harvests of US-origin non-depressed chinook salmon stocks.

Objectives:

1) Develop a DNA and enlarge the existing allozyme database using non-lethal sampling methods to characterize the genetic diversity of chinook salmon in the Yukon River, using 15-20 baseline collections that are representative of the region.
2) Collect data from chinook test fishery sample (Pilot Station) and tagging projects to evaluate run timing, migration patterns, and differential stock mortality.

3) Compare the relative utility of the various marker types (allozymes, microsatellites and SNPs) to mixed stock analysis.

4) Investigate the performance of likelihood and Bayesian statistical approaches to mixture analyses using various classes of genetic markers and develop a statistical method for selecting loci for use in mixed stock estimates.

5) Provide funding and opportunities for local residents, organizations and students in the Yukon area to develop skills in fishery and genetic techniques. A Student Temporary Employment Position will be made available for a local resident attending UAA, UAF, or other university interested in the biological sciences at the FGL for the duration of the project.

6) Expand inter-laboratory standardization of the microsatellite baseline for chinook salmon.

Methods:

A minimum of 15 (up to 20, depending on availability of adequate sample sizes) collections of adults, on or near spawning grounds, will be obtained (archived and new collections will be used) by Tribal Organizations, ADF&G, CDFO and USFWS teams in 2002 and 2003. Non-lethal sampling of fin clips and muscle biopsies from spawning chinook will be conducted with a target sample size N=of 200 per population. Twelve variable allozyme markers can be assayed using fin tissue; simulation analyses show that these markers can be used to identify lower, middle, and upper Yukon River components in mixtures. Additional tissues for complete allozyme analysis will be collected if spawned out chinook salmon are available. A large suite of microsatellite loci will be developed and used in analysis (20-30 loci) through collaboration of the three laboratories. Collections will cover the expanse of the Yukon drainage to permit assessment of population structure. Bayesian methods for mixed stock analysis will be developed to accommodate the occurrence of private alleles in microsatellite samples. Allozyme and DNA marker classes will be compared against each other in mixture analyses and, when possible, against an analysis utilizing both classes.

Deliverables/Products:

Annual and progress reports will be submitted as required for each funding year. A final report, containing the complete summary of the project will be delivered to the Office of Subsistence Management, Fisheries Information Services Division in April 2005. Results will be submitted for publication to a peer-reviewed journal. Local presentations by USFWS, ADF&G and CDFO scientists will be made as appropriate. Bayesian software and baseline data will be made available to the scientific community.

Experience of Investigator(s):

The USFWS Fish Genetics Laboratory (FGL) investigators are full time Geneticists, Fishery Biologists and Technicians who are responsible for conservation and management of fisheries resources on federal and state lands. The staffs have extensive experience in planning and implementing fisheries and genetics projects in the region for a variety of species. Interjurisdictional genetic baseline development projects are currently being conducted with chum salmon

from the Yukon River and coho salmon statewide. Projects supporting National Wildlife Refuge operations involve coho, chum, sockeye, and chinook salmon, as well as rainbow trout, Dolly Varden, steelhead, and whitefish.

The ADF&G Gene Conservation Laboratory (GCL) has extensive experience implementing laboratory and statistical methods of genetic stock identification for salmon including genetic baseline data development using both allozyme and DNA markers, applying these markers to solve questions of fishery interception, statistical approach and software, and development of novel microsatellites for stock identification. GCL staff provides agency leadership by chairing the Stock Identification Working Group of the North Pacific Anadromous Fish Commission and chairing the Microsatellite Standardization Committee for the Coastwide Interagency Group for Salmonid Genetics. The GCL also coordinated the most recent revision of the allozyme database for chinook salmon (http://www.cf.adfg.state.ak.us/geninfo/research/genetics/genetics.htm).

Partnerships/Collaboration/Consultations:

The FGL and GCL have often collaborated on and administered various projects working closely with Tribal Organizations, USGS, CDFO, the Bering Sea Fishermen's Association (BSFA), Universities, NWRs, ES, other Service Regions and the private sector. This project encourages local involvement and educational opportunity for local youth through local hire and Student Temporary Employment Positions. Collaboration with Department of Fisheries and Oceans, Canada is crucial in the meeting Treaty obligations and management concerns. The pre-proposal and investigation plan were developed from discussions between representatives of the USFWS, CDFO, ADF&G, regional tribal organizations; AVCP, TCC, Tanana IRA Council. Existing data and local TEK will be used to identify sampling locations. Field collections will be made cooperatively by staff from these organizations with the assistance of local residents. Training will be provided to local residents and organization staff participating in tissue collection, with the objective of them developing the skills necessary to lead such efforts in the future. Opportunities to assist in the FGL will be made available to qualified college interns from Yukon River communities. We will also work with AVCP and TCC to develop educational opportunities for high school students. Finally, we will contact local subsistence users in the Yukon drainage for information regarding chinook salmon utilization of the Yukon River. If subsistence fishing occurs near spawning areas in the Yukon River or one of its tributaries, we may contract with subsistence fishers for sample collection.

Justification:

This project is a product of the merger and synthesis of two projects: FIS02-094 and FIS02-096. The two projects were originally submitted by different agencies and had overlapping objectives. The TRC recommended that the agencies collaborate on a single, common project in order to better address management goals for chinook salmon in the YR. The TRC identified this project as the number one priority in the Yukon River.

An executive summary and investigation plan have been submitted. This project has two complimentary tracks that would: 1) establish a genetic baseline for chinook salmon using the

best DNA methodology for stock discrimination; and 2) genetically assess the chinook salmon run at Pilot Station using an existing allozyme baseline to identify patterns of stock composition and run-timing. Supporting work involves assessment of statistical analyses. While the existing allozyme baseline is a useful tool for stock identification, the proposed DNA baseline could yield better resolution of stocks. This work is critical for management of Chinook salmon in the Yukon River.

Recommended For Funding

02-006
Subsistence Harvest of Freshwater Fish From Waters Near Arctic Village, Arctic National Wildlife Refuge (ANWR), Alaska

Investigator(s): Alaska Department of Fish and Game (ADF&G), Division of Subsistence, Arctic National Wildlife Refuge (NWR), U.S. Fish and Wildlife Service, Artic Village Tribal Council (AVTC), and the Fairbanks Fishery Resource Office (FFRO), U.S. Fish and Wildlife Service

FY2002 Budget: $ 48,304.00

Total Budget (1): $ 48,304.00

Geographic Area: Yukon

Information Type: HM

Issues:

Subsistence users from Arctic Village have expressed concerns about declines in harvests of white fish *Coregonus* and *Prosopium* spp., lake trout *Salvelinus namaycush*, and northern pike *Esox lucius*, all federally recognized customary and traditional species, in areas near the village. A similar OSM funded project in 2001-02 laid the foundation for the 2002-03 project. The integration of the data from these two years will characterize current harvest amounts and practices to provide information for future management.

Objectives:

1) Determine the number of people in the household and describe the fishing gear used;
2) Identify the primary areas of subsistence fishing;
3) Estimate the number of each species being harvested from these areas;
4) Determine if fishing was poor, fair, or good at each location;
5) Determine if the household fished more often, the same, or less often than in the past;
6) Determine if harvest was shared with other households;
7) Describe the gear used, location fished, and length, age, and sex compositions of each species in the harvest;
8) Compare the information collected in 2002-03 to information collected in 2001-02;
9) Introduce local children to fishery biology; and
10) Develop the educational and interpretative skills of the local technician and students.

Methods:

The harvest survey will be conducted within two strata so that data will reflect the seasonal differences in methods and catch. The first strata will include the open water season (June-September) and the second the ice cover season (October-May). Each stratum will consist of two parts: post season interviews and biological sampling. The biological sampling will occur prior to the interviews for each season. The environmental education component will be conducted during the school year.

The postseason interviews will follow all protocols as prescribed by the Alaska Department of Fish and Game (ADFG) Subsistence Division and the U.S. Fish and Wildlife Service Office of Subsistence Management Fishery Information Services' "Recommendations for a unified subsistence fisheries harvest assessment program". A local technician hired by Arctic Village Tribal Council (AVTC) will be trained in appropriate interviewing techniques fashioned after TEK methodology. Training will also include data collection and management techniques. The interviews will be conducted over a two-week period in September and May. Data will be submitted to ADF&G Subsistence Division for entry into its statewide database.

Biological sampling is designed to collect information about gear used, locations fished, and length, age, and sex of the species harvested. Two local high students hired by AVTC will be trained by a biologist from the FFRO in identifying species, measuring fork length, collecting scales and otoliths for age estimation, and determining the sex of each fish by inspection of the gonads. Training will also include interpretation of data and provide the students with examples of how the data they collect will be used. Students will sample fish as harvesters bring them back to the village. The FFRO will analyze and interpret the biological data.

Deliverables/Products:

The FFRO has responsibility for a final report that will include interview information summarized by ADF&G Subsistence Division. The final report will be delivered to the Office of Subsistence Management, Fishery Information Services Division in electronic and hard copy formats.

Experience of Investigator(s):

The FFRO has conducted numerous fishery investigations in the Alaskan Arctic. Jeff Adams has over 10 years of experience with fish populations and subsistence fisheries in Interior Alaska and Bristol Bay, and Jeff Melegari has over five years of fishery experience in Interior Alaska.

Joanne Gustafson, Park Ranger, Arctic NWR, will work with the FFRO and AVTC to coordinate and train the AVTC technician. Ms. Gustafson is originally from Arctic Village and is on a first name basis with all the residents of villages. She will act as an "on-the-ground" resource for the technician and students.

ADF&G Subsistence Division in Fairbanks has extensive experience with harvest surveys and have been fully involved with planning this project, including participating the village meeting

in April 2001. ADF&G staff will also act as consultants and provide interpretation and recommendations to the FFRO for final the report.

AVTC has worked with the Environmental Protection Agency, Federal Aviation Administration, Bureau of Land Management, and the Bureau of Indian Affairs on joint projects. The Council is fully capable of selecting the technician and students for this project as well as administering the local payroll and providing support for the project.

Partnerships/Collaboration/Consultations:

By participating in data collection AVTC and the village will build rapport with management agencies that will be invaluable for future management efforts. Likewise, the project will provide agencies with opportunities to appreciate the subsistence lifestyle and understand the effects that management actions may have on community. Since 2002-03 will be the second year of the harvest survey, the technician and students will be able to improve on the skills learned in 2001-02. A second year of study will also provide greater opportunity for AVTC to build its administrative capacity and may provide the foundation for future natural resource monitoring programs conducted wholly by AVTC.

Justification:

This project addresses information needs identified by the Regional Advisory Councils as well as addressing local concerns about declines in the subsistence harvest in waters near Artic Village. Information collected from this project will aide managers in evaluating subsistence use and the role of the resource in Artic Village. This project follows on a project begun in 2001, and addresses an important fishery. A second year will allow the investigation team to draw lessons and adapt to problems noted in year one, as well as to get additional information about variation in harvest patterns. Joanne Gustafson, ANWR, also brings her expertise to this project. Capacity building will take place as villages take part in data collection. The Technical Review Committee identified this project as a priority.

Not Recommended For Funding

02-030
Yukon River Salmon TEK

Investigator(s): Yukon River Drainage Fisheries Association

FY2002 Budget: $ 50,319.40

Total Budget (3): $ 100,638.80

Geographic Area: Yukon

Information Type: HM/TEK

Issues:

The Yukon River Drainage Fisheries Association (YRDFA) will continue to gather Traditional Ecological Knowledge (TEK) from fishers in villages along the Yukon River. It is important to gather this local perspective of people along the Yukon River because the salmon runs follow ecological fluctuations over time and local people have a unique understanding of salmon and their behavior. YRDFA will hire and train local residents to collect, document and video-record TEK. Once it is reviewed and approved by the participants and village councils, YRDFA will compile the information into a written report and a video. The investigator will then work to combine the traditional knowledge gathered with the Western scientific method in order to improve salmon management.

Objectives:

1) Refine the process of collecting and documenting TEK from Yukon River residents.
2) Survey local people along the Yukon River about TEK of salmon species, potential explanations for low and high salmon abundance and salmon behavior
    - Use key informant interviews at a few select locations along the drainage, primarily skilled harvesters and elders.
    - Utilize local resources such as Tribal councils, community residents and youth to implement surveys and document results.
3) Provide additional consideration to ways that TEK can inform fisheries management decisions.

Methods:

In order to carry out a successful project, YRDFA will continue to work with a TEK consultant that will help with various stages of this implementation plan. YRDFA has previously worked with Polly Wheeler and Dave Andersen of Subsistence Division of the Alaska Department of Fish and Game in order to solicit their knowledge and experience with TEK projects on the Yukon River. The investigators will review the previous one-year project (FIS 01-015) to collect and document Yukon River salmon TEK to consider in this two year project. Investigators will converse with key individuals from villages and agency personnel to help refine the process of how TEK is collected and documented and identify particularly knowledgeable and interested individuals and communities to continue the TEK research project. The investigators will identify methods for maturation of TEK projects, conduct extended TEK interviews, and if

feasible utilize the semi-directive interview primarily with individuals and small groups. In addition, the investigators will facilitate an iterative process that leads to a contextual discussion of salmon abundance and scarcity over time, salmon behavior in response to climatic and river conditions and variations within a salmon run. The investigators will train and employ local residents in the collection and documentation of TEK.

Deliverables/Products:

Work with TEK consultant to compile a draft report for circulation to participants, village councils and RAC's for review. Arrange information from each village by topic and themes. Analyze and interpret. Determine if maps are an integral component to fisheries TEK research. If so, produce maps of pertinent spatial data. Use students familiar with ArcView / GIS to economize on funds. The investigators will visit villages and/or hold a teleconference to review the draft report in a timely manner and to gain input on which sections of the report may contain sensitive data. Insert any additions, deletions or corrections. Findings will be discussed with meeting participants at YRDFA four-day annual meeting in 2002. A final report with maps, text and a video will be sent to participants, village councils, federal and state agencies, OSM and others who are interested.

Experience of Investigator(s):

Over the past ten years the YRDFA has had many successes. Foremost, it has dramatically improved cooperation between the different users along the Yukon River. Both the Alaska Legislature and the various agencies of the State of Alaska pay more attention to the Yukon salmon fisheries now that all areas of the River are united by a common voice. Second, the YRDFA has helped obtain funding for new restoration projects as well as protect and improve management funding for the ADF&G Yukon programs. Third, the YRDFA has helped inform villagers of the ongoing negotiations with the Canadians on a Yukon salmon treaty. Finally, the YRDFA has also served as a forum to discuss the variety of issues confronting Yukon fishermen: marine conditions, offshore interception, habitat protection, subsistence, marketing, and various regulatory issues.

YRDFA Projects manager, Jill Klein, has assisted at the 2000 Fort Yukon meeting, at a one day pre-season fishermen's meeting in Emmonak, a US/Canada salmon treaty informational meeting in Mt. Village and various workshops during her former employment with the Yukon River Inter-Tribal Watershed Council. Ms. Klein has received a Master's degree from the School for International Training in Brattleboro, Vermont. Her Master's work in International and Intercultural Management will also prove useful towards the successful completion of this project. Both Mr. Senecal-Albrecht and Ms. Klein have worked in cross-cultural settings and are sensitive to cultural differences that may arise while carrying out a project in the area of TEK.

Ms. Klein will have overall responsibility for the project. She will plan for survey trips, prepare the survey instrument, train interviewers, review documentation and prepare both the first draft and final version of the report. Ms. Klein will directly supervise any subcontractors hired for this project. Mr. Senecal-Albrecht will provide overall guidance to Ms. Klein and other contractors

hired for this project. Mr. Senecal-Albrecht will provide editing to the final report.

Partnerships/Collaboration/Consultations:

YRDFA will be adding to the local economy of Yukon villages by holding TEK interviews in approximately three to six villages along the Yukon River. YRDFA would like to train and hire local residents in the villages to conduct TEK interviews. This will enable local residents to gain training and employment experience in TEK research projects.

This project will also implement a community based research design that utilizes local knowledge. This process will help people to feel appreciated for their knowledge and concerns. Utilization of TEK increases the level of mutual respect and understanding between local residents and state and federal agencies. This project will promote a bridge that can be made between such areas as traditional knowledge and stock status and trends. This practical bridging of knowledge can positively affect fisheries management to protect and preserve salmon species and the livelihood of subsistence and commercial fishing on the Yukon River.

Local people of the Yukon River need recognition that their traditional values and ways of thinking about the world are valid and important. The study of TEK validates the use of local knowledge in the understanding of the environment and ecology. The solicitation of TEK from elders can motivate youth to learn more about their cultural heritage and create a link between the generations. This will empower local people to deal with ecological problems and create a more sustainable living climate for future generations.

Recommendation:

This project is not recommended for funding in 2002.

Justification:

This two-year project is a continuation of a project funded in 2001. The 2001 project is on track, with interviewing in the villages of Alakanuk, St. Marys, Holy Cross and Nulato. Deliverables from the 2001 project consist of a written report of qualitative data incorporating local knowledge, which will be useful for improved fisheries management in this region. The 2002 project proposes to focus on four more villages in other, as yet unspecified, areas of the Yukon River. The proposal focuses on the YK SRAC's priorities with respect to TEK. The study has high strategic value, building on last year's efforts, gathering important information on the dynamics of a salmon fishery that is of especially high concern now with catastrophic run failures. YRDFA has strong experience in successfully managing a broad fisheries research program. Ms. Klein has successfully completed a previous project, part of which has become part of her formal graduate study. With respect to methods, there is great value in the first year's experience and the consultations carried out with key researchers, such as Amy Craver at Alaska Native Science Commission. Local hiring will be an integral part of the project. The project requests $50,319 a year for two years. Technical Review Committee members recommended that FIS 02 037 be given priority for funding over FIS 02-030. Questions concerning exactly

which four villages would be targeted in FY 2002 made it difficult for the TRC to regionally prioritize this project. The funding requests in the Yukon region, Harvest Monitoring/TEK category, greatly exceeded available resources. As a result, this worthy project is not being recommended for funding this year.

Recommended For Funding

02-037
Harvest Monitoring of Subsistence Non-Salmon Fish in the Lower Yukon River

Investigator(s): Division of Subsistence, Alaska Department of Fish and Game; Tanana Chiefs Conference, Inc.

FY2002 Budget: $ 60,130.00

Total Budget (3): $ 238,984.00

Geographic Area: Yukon

Information Type: HM/TEK

Issues:

Investigators will collect TEK and quantify harvest of non-salmon subsistence fish species to assess the level of harvest, assess the accuracy of other harvest assessment methods, and address local concerns over increasing harvests of important non-salmon subsistence fish species due to increasingly poor salmon runs.

Objectives:

1) Collection of TEK
2) Harvest Assessment
3) Capacity Building

Methods:

TCC, the Tribes and ADF&G will work collaboratively to collect subsistence harvest information on important non-salmon species of freshwater fish. Household surveys will be conducted under direct supervision of TCC. Standardized survey methods and protocols developed by TCC and ADF&G will be utilized. The goal will be to contact all area households regarding their subsistence harvest and use of non-salmon species.

Completed original survey forms will be provided to ADF&G Subsistence Division for review and analysis. Harvest information at the individual household level will not be distributed. However, community statistics will be provided following data analysis. One year of harvest data will be collected and analyzed, and compared with previous data collection efforts to account for and examine variability in harvests and harvest patterns between years. It is hoped that this project will provide a baseline of harvest and use of non-salmon fish species, and that that data will provide comparisons and additions to this important database.

In addition, TEK on non-salmon ecology will be collected from local experts in the GASH area,

including the communities of Grayling, Anvik, Shageluk and Holy Cross. This effort is intended to pull together a valuable body of local information and observations on non-salmon species. Traditional Ecological Knowledge will be collected in several ways. The primary data collection method will be through interviews with key informants. In each community, individuals considered to be knowledgeable about non-salmon fish species will be identified with the assistance of TCC and Tribal personnel: knowledgeable individuals will be contacted and interviewed if possible. Based on time and budget constraints, we estimate being able to interview between fifteen and twenty individuals. The second TEK collection phase will allow for additional follow-up, and to take into account information gathered during the harvest survey.

Individuals will be interviewed using a semi-structured interview format outlining general areas of discussion and developed in advance by ADF&G, TCC and Tribal personnel. Respondents will be paid for their time. If possible, interviews will be recorded; if they are not recorded then the interviewer will take careful notes. To ensure as complete a record as possible, at least two researchers will be present during key respondent interviews. During interviews, pictures and maps will be utilized as prompts and relevant information (e.g., locations of spawning areas, rearing habitat, traditional harvesting areas, etc.) will all be mapped using USGS 1:250,000 maps and Mylar overlays.

Data Collection will focus on the following types of information on non-salmon species (as reported by local experts):

1) Taxonomy, that is, species utilized and local names for fish species
2) Life History/Biology information including habitat preferences, spawning & rearing areas, seasonal movements of fish
3) Traditional/Contemporary Harvest Methods, including timing of harvest, gear used, mapping of harvest areas and collection of fish-related place names
4) Traditional and Contemporary Preparation & Preservation Methods
5) Use, how various fish and fish bi-products are used for human food, dog food, trapping bait etc.
6) Relative abundance and population trends

Deliverables/Products:

This project will produce Comprehensive Report on Traditional Ecological Knowledge and Contemporary Use of Non-Salmon Fish in the GASH area. It will include total harvest estimates for subsistence non-salmon species for residents of Grayling, Anvik, Shageluk and Holy Cross. This estimate will be compatible with the estimates made by ADF&G for non-salmon species for other communities in the state. Additional information will include compiled information on fishing effort, gear types, and participation rates. Finally, local knowledge on a variety of topics

will be compiled into a CD ROM database.

Experience of Investigator(s):

Dr. Polly Wheeler is the Regional Program Manager for the Alaska Department of Fish and Game, Division of Subsistence, for the Interior, Western and Arctic office based in Fairbanks. Polly has worked on natural resource issues in Alaska for almost twenty years. She has conducted anthropological research in almost every area of the state, and has worked with Tribes and tribal organizations in a variety of capacities. Dr. Wheeler is responsible for project oversight and administration.

Mr. David Andersen is a Subsistence Resource Specialist II with the Alaska Department of fish and Game, Division of Subsistence. Dave has worked throughout Alaska and on Interior Alaska issues since 1985. He has conducted a number of harvest assessment and TEK-based projects examining throughout the Interior. Dave recently completed an FIS funded TEK project, producing a report entitled "*Whitefish and Beaver Ecology of the Yukon Flats, Alaska."* He is well versed in methods of documenting local information through interview techniques. Dave is primarily responsible for the Subsistence Divisions' activities on this project.

Mr. Stanley Ned is senior researcher with TCC Wildlife and Parks program. Mr. Ned has been intimately involved in resource harvest and use issues for several decades, and he has worked with Dr. Wheeler on several harvest assessment projects. Mr. Ned is responsible for coordinating and carrying out Tanana Chiefs Conferences' activities on this project.

Partnerships/Collaboration/Consultations:

Staff from TCC will conduct this project in collaboration with staff from ADF&G Division of Subsistence. Local technicians will be hired to work on the harvest surveys. ADF&G will model this project on numerous previous collaborative works. The survey instrument will be designed collaboratively, and ADF&G will train local surveyors in methods of survey design and implementation. ADF&G will screen and analyze the data, and ADF&G and TCC staff will write the final report collaboratively.

Justification:

The project proposes to estimate the total annual harvest of subsistence non-salmon fish by species by residents of Grayling, Anvik, Shageluk and Holy Cross over a three-year period, as opposed to the two years originally proposed in the pre-proposal. It would compile information on fishing effort, gear types, and participation rates for non-salmon fish. It will also update community household lists and identify non-salmon fishing households. This proposal addresses a federal subsistence fishery, and it addresses a SRAC, federal, and state issue of great concern. It focuses on a serious conservation problem and will complement efforts currently underway by OSM FIS, Refuges, Innoko NWR, and the state to address user conflicts there. Study objectives are clear and achievable, are consonant with similar efforts planned for elsewhere in the state. The study is appropriately designed, using technically sound methods and appropriate analysis

procedures. The project will produce a total harvest estimate. Funding is requested for three years. The proposers have the technical and administrative expertise to complete the project, and have an excellent track record with similar prior projects. Tanana Chiefs Conference, a local entity is co-PI on this project, their participation strengthens the proposal. The CD ROM database will enhance the dissemination of information to the appropriate entities. This project is strongly supported within the region as it addresses identified information needs, where little prior research exists. The only other report available is Wheeler 1991.

Recommended For Funding

02-084
Review of Oral History Tapes on the Traditional Ecological Knowledge of Subsistence Harvests and Fishes, Old John Lake and Surrounding Water Bodies, Arctic Village, Alaska

Investigator(s): Alaska Department of Fish and Game (ADF&G), Division of Subsistence, Arctic National Wildlife Refuge (NWR), U.S. Fish and Wildlife Service and the Artic Village Council (AVC)

FY2002 Budget: $ 26,500.00

Total Budget (1): $ 26,500.00

Geographic Area: Yukon

Information Type: TEK

Issues:

Most fishes harvested during subsistence fisheries by residents of Arctic Village, Alaska, are caught in Old John Lake. Residents are concerned that changes in the Arctic climate may be adversely affecting fish populations in Old John Lake and surrounding water bodies. This project, through review and retrieval of information concerning Old John Lake and surrounding water bodies in previously taped oral histories of Arctic Village and Venetie elders who have now passed away, will be added to the body of information collected last year as part of a Federal subsistence funded project (FIS 01-003) to document the long term changes in the ecology and fisheries of Old John Lake.

Objectives:

1) Document historical subsistence utilization of fishes in Old John Lake and surrounding water bodies; and
2) Record various aspects of the ecology of fishes living in Old John Lake and surrounding water bodies by gathering and summarizing traditional ecological knowledge from Arctic Village Native elders and local residents.

Methods:

Project investigators will review previously taped oral histories, from the 1970s and early 1990s, from now deceased elders of Arctic Village and Venetie and retrieve information concerning Old John Lake and surrounding water bodies. This retrieved information will then be added to the body of information collected from oral interviews with elders in 2001. In addition, the second

year will be used to conduct any follow up interviews to clarify information collected last year or to clarify information gathered from the taped oral histories this year. The purpose of this information is to collect traditional ecological knowledge on the ecology of Old John Lake, the fishes inhabiting the lake, and the subsistence fisheries conducted on the lake. This TEK project is a companion project to the current cooperative harvest/stock status project (FIS 01-011). Information collected in this project and the harvest/stock status will determine future research needs. Arctic NWR and the Arctic Village Natural Resource staff will be responsible for the design and completion of the project. Study design will be coordinated with the USFWS Fairbanks Fishery Resource Office to assure compatibility with their companion project. Also, the project will be coordinated with ADF&G - Division of Subsistence to utilize their technical expertise in collecting and reporting on traditional ecological knowledge. Staff from Arctic NWR and Arctic Village Natural Resource staff or individuals hired within the community will conduct review of the taped oral histories cooperatively.

Outreach is an added focus for this 2002 proposal, information gathered from the project in 2001 and 2002 will be presented to several classes of Arctic Village students. The presentations will be interactive, ensuring student participation, focusing on traditional lifestyles and knowledge of the elders. Elders will be invited to talk about their experience with the project and to also expound on the information presented in the report.

Deliverables/Products:

Review of the taped oral histories and transcription of pertinent information will be conducted during the spring/summer of 2002. This information will be added to the searchable database developed as part of the 2001 project, with a final report completed by the end of February 2003. Classroom presentations will be conducted at Arctic Village Schools during the winter of 2002/2003. Staff from Arctic Refuge will have primary responsibility for completing the report with support from Arctic Village staff. Staff will work with ADF&G Division of Subsistence to incorporate the information into the database and offer technical review of the final report. The investigators plan to include information within the report documenting when, where, and how fishes were harvested in the lake, approximate numbers of fishes caught each year, and any changes in the environment or physiography of the lake.

Experience of Investigator(s):

Joanne Gustafson, Park Ranger, Arctic NWR, will work with FFRO and AVC to coordinate and train the AVC technician. Ms. Gustafson is originally from Arctic Village and is on a first name basis with all the residents of the villagers. She will act as an “on-the-ground” resource for the technician and students.

ADF&G Subsistence Division in Fairbanks has extensive experience with TEK and have been fully involved with planning this project, including participating the village meeting in April 2001. ADF&G staff will also act as consultants and provide interpretation and recommendations to Arctic NWR staff for final the report.

AVC has worked with the Environmental Protection Agency, Federal Aviation Administration, Bureau of Land Management, and the Bureau of Indian Affairs on joint projects. The Council is fully capable of selecting the technician and students for this project as well as administering the local payroll and providing support for the project.

Partnerships/Collaboration/Consultations:

By participating in translation AVC and the village will build rapport with management agencies that will be invaluable for future management efforts. Likewise, the project will provide agencies with opportunities to appreciate the subsistence lifestyle and understand the effects that management actions may have on community. Since 2002-03 will be the second year of the harvest survey, the technician and students will be able to improve on the skills learned in 2001-02. A second year of study will also provide greater opportunity for AVC to build its administrative capacity and may provide the foundation for future natural resource monitoring programs conducted wholly by AVC.

Justification:

This project builds upon on a 2001 project. The project addresses local concerns and data gaps for TEK and harvest monitoring in this region. The information collected will build on an existing database and give managers a historical perspective on regional subsistence use. The projects P.I. Joanne Gustafson, a graduate student and ANWR staffer has expertise in TEK and first hand knowledge of the community and surrounding area. This project is strategically valuable and provides information on TEK and subsistence use of fish in Old John Lake. This project has a strong partnership component, which will promote capacity development. The TRC requests clarification on how the project will supplement project FIS 01-003 and avoid duplication of previously funded work.

INTER-REGIONAL OVERVIEW

Issues and Information Needs

- A number of Regional Advisory Councils have identified issues and information needs that apply to more than one region or have statewide application. There is continued interest in:

    - Organization of existing, as well as new, fisheries information in a way that can be easily located and obtained by Tribal, State and Federal interests;
    - Development of consistent methods for subsistence harvest monitoring and conducting Traditional Ecological Knowledge studies;
    - Improvement of methods used to set salmon spawning goals and sustain subsistence harvests;
    - Expanded communication and coordination among regions to better achieve resource stewardship and more effectively deploy program funds through coordinated planning.

- The Federal Subsistence Board decided it would not fund studies dealing with hatchery propagation, restoration, enhancement, and supplementation; habitat protection, restoration, and enhancement; or contaminant assessment, evaluation, and monitoring.

- Regulatory issues can also be used to identity issues and information needs. Two statewide regulatory proposals were submitted in 2002. One seeks changes to existing subsistence fisheries practices, while the other seeks to establish a new Federal subsistence permit for marine fishes.

Studies Forwarded for Investigation Plans

- The Technical Review Committee advanced a total of five studies for Investigation Plan development. A total of $178.1 thousand would be needed to fund these studies in fiscal year 2002, while only $105.0 thousand is available **(Tables 1, 2, and 3).**

- In making funding recommendations, the Technical Review Committee considered strategic needs for the information, technical merits of the study, performance ability of investigators, and contributions to local partnership and capacity building.

Recommendation Process—Stock Status and Trends Studies

- Three studies were advanced for Investigation Plan development in the Stock Status and Trends category **(Table 1)**. Each of these studies addresses a different general issue: Subsistence Fishery Management Practices, Fishery Information Access, and Catch-And-Release Fish Mortality.

Table 1. Proposed recommendation of 2002 Inter-Regional stock status and trends investigation plans for funding consideration.

Proposed recommendations are shown with bold type, and noted with "Yes" in the "Recommendation" column.

FIS #	Title	Recommendation	Requested Budget 2002	2003	2004
02-025	**Development of General Method for Calculation of Sustainable Subsistence Harvest**	**Yes**	**$45.7**	**$74.7**	**$48.4**
02-069	**Develop Shared AYK Fishery Database**	**Yes** *a*	**$31.9**		
02-071	Strategy for Assessing Release Mortality of Sport-Caught Fish in Western and Interior Alaska	No	$59.0	$187.2	
	GRAND TOTALS		$136.6	$261.9	$48.4
	TARGET BUDGET LEVELS		$70.0	$159.7	$159.7
	PROPOSED SELECTIONS		**$77.6**	**$74.7**	**$48.4**

a This proposal reached the investigation plan stage in 2001 as study 01-016. Modifications in 2002 greatly lowered cost.

Table 2. Proposed recommendation of FY 200 Inter-Regional harvest monitoring and Traditional Ecological Knowledge investigation plans for funding consideration. Proposed recommendations are shown with bold type, and noted with "Yes" in the "Recommendation" column.

			Requested Budget		
FIS #	Title	Recommendation	2002	2003	2004
02-043	**Alaska Subsistence Fisheries Database GIS Integration**	**Yes**	**$27.5**		
02-047	Alaska Subsistence Salmon Harvest Timing (Phase 1): Bristol Bay, Chignik District, Cook Inlet, and Kuskokwim Drainage	No	$14.0	$14.5	
	GRAND TOTALS		$41.5	$14.5	$0.0
	TARGET BUDGET LEVELS		$35.0	$0.7	$79.9
	PROPOSED SELECTIONS		**$27.5**	**$0.0**	**$0.0**

Table 3.

FY 2002 Inter Regional Projects

Region 7. Inter regional

Type A . Stock Status & Trends

Doc #	Agency/Org	Title	NGO $	Fed$	State $	Total $
02-025	UAF, UW	Development of general method for calculation of sustainable subsistence harvest	$45,741.00	$0.00	$0.00	$45,741.00
02-069	ADFG-CFD	Develop Shared Fishery Database	$0.00	$0.00	$31,900.00	$31,900.00
02-071	ADFG-SFD, USFS	Assessment of Scientific Studies Relating to the Practice of Catch-and-Release Fishing in Western and Interior Alaska	$0.00	$0.00	$59,000.00	$59,000.00
Total			$45,741.00	$0.00	$90,900.00	$136,641.00

Type B. Harvest Monitoring/TEK

Doc #	Agency/Org	Title	NGO $	Fed$	State $	Total $
02-043	ADFG-SD	Alaska Subsistence Fisheries Database GIS Integration	$0.00	$0.00	$27,525.00	$27,525.00
02-047	ADFG	Alaska Subsistence Salmon Harvest Timing (Phase I): Bristol Bay, Chignik District, Cook Inlet, and Kuskokwim Drainage	$0.00	$0.00	$13,991.29	$13,991.29
Total			$0.00	$0.00	$41,516.29	$41,516.29
Grand Total			$45,741.00	$0.00	$132,416.29	$178,157.29

- Funding requested for the three stock status and trends studies advanced for investigation plans totaled approximately $136.6 thousand for fiscal year 2002, while a total of $70.0 thousand is available.

- The Technical Review Committee recommended funding for two studies in fiscal year 2002 **(Table 1).** Total cost for these projects in fiscal year 2002 is anticipated to be about $77.6 thousand, which is about 10% more than the target budget level.

- Although the Technical Review Committee had asked for a proposal to form a working group to examine catch-and-release mortality of fishes, they did not recommend the submitted study be funded. This decision was based on budget limitations and the greater perceived strategic importance of two other studies. One would seek to change existing methods used to set salmon spawning goals and sustain subsistence harvests, while the other would complete database work begun in fiscal year 2000 for the Arctic, Yukon, and Kuskokwim regions.

Recommendation Process – Harvest Monitoring and Traditional Ecological Knowledge Studies

- Two studies were advanced for Investigation Plan development in the Harvest Monitoring and Traditional Ecological Knowledge categories **(Table 2)**. Both of these address the issue of Harvest Information Access.

- The Technical Review Committee recommended funding for one study in fiscal year 2002 **(Table 2)**. Total cost of this project in fiscal year 2002 is anticipated to be about $27.5 thousand, which is about 21% less than the target budget level.

- Both studies had technical merit, would be done by experienced investigators, and would contribute to capacity building. However, the recommended study, which would integrate two existing statewide databases into a single Geographic Information System to enhance availability and use, was thought to have greater strategic importance than the other study, which would make subsistence harvest timing information easier to access and use.

Funding Recommendation Summary

- Three studies, two Stock Status and Trends studies and one Harvest Monitoring/Traditional Ecological Knowledge study, were recommended for funding with a cost of $104.0 thousand in fiscal year 2002 **(Tables 1, 2, and 3).**

- All funding for these three studies would go to non-government organizations and State agencies **(Chart 1).**

- About 11% of the funds for these three studies ($12.0 thousand) would be used for local hire, while investigators would contribute $28.0 thousand in matching funds **(Table 4).**

Chart 1. 2002 Inter–regional funding distribution

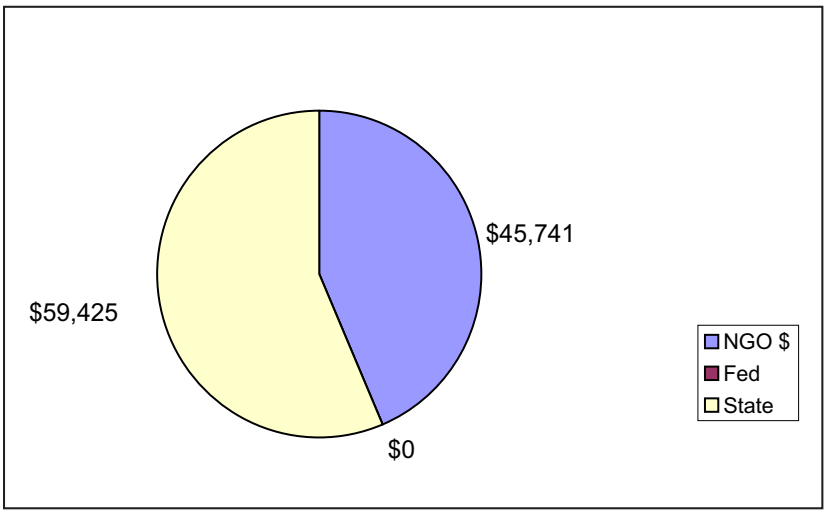

Table 4.

2002 Local Hire and Matched Funds Report Inter Regional

Region **7. Inter regional**

Type **A . Stock Status & Trends**

Doc #	Agency/Org	Title	Local Hire $	Matched $
02-025	UAF, UW	Development of general method for calculation of sustainable subsistence harvest	$0.00	$0.00
02-069	ADFG-CFD	Develop Shared Fishery Database	$12,000.00	$28,000.00
02-071	ADFG-SFD, USFS	Assessment of Scientific Studies Relating to the Practice of Catch-and-Release Fishing in Western and Interior Alaska	$0.00	$0.00
Total			$12,000.00	$28,000.00

Type **B. Harvest Monitoring/TEK**

Doc #	Agency/Org	Title	Local Hire $	Matched $
02-043	ADFG-SD	Alaska Subsistence Fisheries Database GIS Integration	$0.00	$0.00
02-047	ADFG	Alaska Subsistence Salmon Harvest Timing (Phase I): Bristol Bay, Chignik District, Cook Inlet, and Kuskokwim Drainage	$0.00	$6,000.00
Total			$0.00	$6,000.00
Grand Total			$12,000.00	$34,000.00

- Investigation plans not selected for funding this year will not automatically become eligible for funding consideration next fiscal year. Investigators need to submit new proposals requests to fund this work in fiscal year 2003.

Study Recommendations, Descriptions, and Justifications

- Additional details about each project can be found in the sections that follow. For each project, we have included the Technical Review Committee recommendation, a project description, and the technical justification for the recommendation.

- Study information is organized into two sections. The first contains Stock Status and Trends studies information, while the second contains Harvest Monitoring and Traditional Ecological Knowledge studies information. Within each section, studies are organized by their assigned numbers, in increasing order.

Recommended For Funding

02-025
Development of General Method for Calculation of Sustainable Subsistence Harvest

Investigator(s): University of Washington, School of Aquatic and Fishery Sciences; University of Alaska Fairbanks, Juneau Center, School of Fisheries and Ocean Sciences; Alaska Department of Fish and Game, Division of Commercial Fisheries

FY2002 Budget: $45,741.00

Total Budget (3 years): $168,910.00

Geographic Area: Inter-Regional

Information Type: Stock Status and Trends

Issues:

A key question in management of all subsistence fisheries in Alaska is determining the level of sustainable subsistence harvesting. This project will develop a new paradigm and algorithm for calculation of sustainable levels of subsistence harvesting in the form of a protocol and computer program for analyzing available data on a salmon stock and evaluating the long term consequences of different harvest policies.

Objectives:

1) Develop a format for definition of subsistence fishery management objectives.
2) Use defined objectives to analyze utility functions for different levels of catch and different inter-annual variation in catches for defined subsistence user groups.
3) Develop computer software to evaluate alternative management policies.
4) Use a decision-analysis framework to analyze objectives, including evaluation of uncertainty.
5) Develop a protocol for using the computer software, consisting of a users manual, worked examples, and a web-based power-point demonstration of how to use the software and interpret results.

Methods:

The three major innovative components of the protocol to be developed would be (1) describing salmon population dynamics using ecosystem oriented models that move beyond fitting stock and recruitment data to Ricker models, (2) evaluating harvest policies that maximize objectives other than long-term maximum yield, and (3) using formal methods of statistical decision-analysis to incorporate uncertainty into the evaluation of consequences. Salmon population models would include components to simulate (1) dynamics of populations at low abundance densities, (2)

being managed, (5) forms of compensatory mortality other than Ricker model type, (6) implementation error associated with estimating run size and catch in a year, and (7) effects of oceanic regime shifts on salmon production. The computer program developed would be written using AD Model Builder software (Otter Software, Nanaimo B.C.), and the user interface would be programmed in EXCEL to provide a user-friendly format for data entry and output. Workshops and meetings would be scheduled during the project to gather and disseminate information among agencies and organizations.

Deliverables/Products:

The final product of this project would be a computer software package and protocol that should greatly enhance the ability of fisheries management agencies and organizations to evaluate alternative subsistence harvesting regimes. Reports would also be written at the end of each work year to describe methods, data, results and accomplishments, as well as any proposed changes in design or methods. These reports would be produced in both paper and electronic format, and provided to the Office of Subsistence Management as well as the Alaska Resources Library Information System (ARLIS).

Experience of Investigator(s):

The investigators from University of Washington and University of Alaska have extensive experience in all aspects of this project and have been leaders in salmon research, particularly in the area of quantitative stock assessment. They have worked closely with management agencies and various user groups to evaluate salmon spawning goals and management policies, and have held workshops on various fishery topics for both professional and lay audiences.

The investigator from Alaska Department of Fish and Game has worked extensively on applied salmon research and management topics, including scientific evaluation of harvest policies.

Partnerships/Collaboration/Consultation:

While the software developed by this project would primarily be used for analyses conducted by professional biologists working for agencies or regional groups, subsistence user groups would have a key role in developing subsistence fishery management objectives and evaluating resulting products. Consultations have already taken place with Bristol Bay Science Center, Aleutians East Borough, Chignik Regional Aquaculture Association, and Alaska Department of Fish and Game. Further consultations would occur with other regional organizations and Federal fishery management agencies.

Justification:

The overall concept for this work has merit, and new methods for establishing salmon escapement goals and subsistence harvest strategies would benefit both management agencies and subsistence users. The investigators propose to develop methods and software to estimate sustainable subsistence salmon harvests. Methods currently being used are based on achieving

maximum sustained yield, which is not a suitable management goal for management of subsistence fisheries, and on empirical models, which do not incorporate uncertainty. The technical approach proposed to develop this methodology is excellent. Two modifications are needed improve the usefulness of this work to Federal subsistence fishery program. First, the focus of proposed efforts was directed primarily at sockeye salmon and State-managed subsistence fisheries. This project needs to be broadened to include other salmon species and to focus on Federally managed, rather than State managed, subsistence fisheries. The most difficult Federal subsistence management issues currently exist for chinook and chum salmon runs to the Yukon and Kuskokwim Rivers. Therefore, at least one of these species in one of these systems should be used as a test case for model development and evaluation. Second, a staff member from a Federal fishery management agency needs to be added as a partner to serve a function analogous to that served by the State management agency partner. This would help ensure acceptance of this tool by both state and Federal fishery management agencies.

The investigators and their organizations or agencies have both the administrative and technical expertise to conduct this work. At least one of the investigators also has a great deal of experience conducting effective workshops with both professional fishery biologists and resource users on various stock assessment procedures and fisheries problems.

Partnership and capacity building aspects of this proposed study, while improved from that described in the original proposal, still require further refinement and development. The Investigators have selected an issue with widespread interest among Federal subsistence users and management agencies, but need to ensure that meaningful participation and information exchange occurs with local communities and residents, and that local support exists for the proposed study. No letters of support for this work were received from local organizations, and consultations with these organizations have been too limited. While technical reviewers and fishery managers generally see a benefit from conducting the proposed work, Regional Advisory Council members and Federal subsistence users may not understand or agree with this approach. Therefore, investigators may need to put more effort into explaining the need for this work and its products to this audience.

Recommended For Funding

02-069
Develop Shared Fishery Database

Investigator(s): Division of Commercial Fisheries, Alaska Department of Fish and Game

FY2002 Budget: $ 31,900.00

Total Budget (1 year): $ 31,900.00

Geographic Area: Inter-Regional

Information Type: SST

Issues:

This is a continuation and next phase of a database inventory, planning and development project funded in fiscal year 2000 (*Shared Information for Fishery Management in AYK, FIS00-016*). A data management system for management of fisheries in the Arctic/Kotzebue/Norton Sound, Yukon River, and Kuskokwim River federal subsistence fisheries management regions does not currently exist. The goal of this project is to develop a comprehensive data management system for use by all governmental and public entities involved in managing these fisheries. Ready access to critical fisheries information would be beneficial to both management agencies and subsistence users.

Objectives:

1) Aggregate diverse sources of fishery data.
2) Error-check and correct historic data as necessary.
3) Begin standardizing data formats, where necessary, for inclusion into a centralized database.
4) Develop intermediate data entry, editing and reporting programs for area staff so that more thorough error checking, editing and a standard format of data can begin as soon as possible.

Methods:

This would be the second year of a project first funded in fiscal year 2000. Activities for fiscal year 2002 would focus on completing any remaining data inventory, editing, entry, and documentation; and to correct or reconfigure important data sources that are currently in a format that would be especially difficult to incorporate into a data management system. The major information sources needed for an information management system were identified as subsistence and commercial harvests, spawning escapements, and ancillary biological data such as age, sex and size. Each of the specific objectives listed above would be completed for each of these data sources. Alaska Department of Fish and Game staff in area offices would transfer biological and recent spawning escapement data to a centralized location, Division of Commercial Fisheries Region III Biometrics Section in Anchorage, so that the work can be accomplished. Area office staff would work closely with Biometrics Section staff in editing and correcting historic data.

Several critical data sources have already been identified as needing immediate attention to prevent data loss. Editing and reporting programs would also need to be developed for some data sources. Additional problems or needs would be identified and, if possible, corrected during this next year of the project.

Deliverables/Products:

A project report detailing accomplishments; descriptions of which data have been aggregated, edited, and reformatted; and examples or descriptions of intermediate data entry forms and reports would be submitted by October 31, 2002. Also available would be an updated inventory of data sources developed during 2000 activities, including documentation on data content, storage format, any particular problems, and a primary contact; and updated examples of management reports, data access, data linkage types, and data summaries required by parties involved in fishery management.

Experience of Investigator(s):

The principal investigator has over twenty years of experience in the Arctic-Yukon-K Region as both a fisheries biologist and biometrician for Alaska Department of Fish and Game. She has extensive knowledge of how fishery data is collected, stored, compiled and interpreted to support resource management needs. She is familiar with modern database software, uses database software on a regular basis, and has developed and maintained several smaller-scale data management systems. She also worked for several years as the primary region contact and contributor on a closely related, federally funded project to aggregate salmon escapement data into a central Geographic Information System. While not assigned to this project, the Division of Commercial Fisheries has staff in their Headquarters office that could provide assistance to the principal investigator. These staff members develop and maintain several large-scale client-server databases, such as the Mariner data management system used in Bristol Bay and the Alex/IFDB data management system used in Southeast.

Partnerships/Collaboration/Consultations:

Efforts would be made to hire local residents as technicians or fisheries biologists to assist Alaska Department of Fish and Game area staff and the principal investigator with data editing. Training in the use of computer software would be provided.

Fisheries management activities within the Arctic-Y-Kuskokwim region has more and more become a cooperative effort among the Alaska Department of Fish and Game, local organizations such as the Kuskokwim River Salmon Management Working Group and the Yukon River Drainage Fisheries Association, and federal agencies. Activities have included fisheries management and restoration planning, data collection and information sharing, and pre-season, in-season, and post-season consultations. These efforts have been developing for over a decade, have increased the participation of rural residents in the management process, and have improved the management of the region's fisheries.

year of activity was approved by the Federal Subsistence Board in 2000 to complete two objectives: 1) comprehensive inventory of available data, and 2) determination of information needs of government agencies and non-government organizations involved in cooperative fishery management. This work has generally proceeded on schedule, and both 2000 project objectives will be successfully completed. A detailed progress report was submitted June 15, 2001, a short performance report is due September 3, 2001, and the final report is due December 30, 2001. A 2001 proposal to continue these efforts was requested by the Technical Review Committee. It was advanced to the investigation plan stage as study FIS 01-016, but did not receive further consideration because the investigator did not require funding until 2002. Activities proposed for 2002 consist of 1) aggregating the diverse sources of fishery data identified in 2000, 2) checking and correcting errors, 3) standardizing data formats to facilitate inclusion into a centralized database, and 4) developing intermediate data entry, editing and reporting programs to ensure more thorough error checking, editing, and standard formatting during future data collection activities. The strategic importance of making fisheries information easily accessible through a shared database is quite high. While the final scope and design of the database will be influenced by results and recommendations of the Database Working Group funded in 2001 (study FIS 01-154), proposed objectives for the 2002 study are general enough to be successfully achieved without waiting for final recommendations and protocols from the Working Group. The investigator has incorporated proposal review recommendations into the investigation plan, and has considerably reduced the amount of funding requested for this study. Full-time personnel costs would be covered by the State as in-kind matching funds. Efforts would be made to hire local residents to assist in data entry, editing, and formatting. This would help foster local interest and ownership in the final product and strengthen partnership and capacity building aspects of this work.

Not Recommended For Funding

02-071
Assessment of Scientific Studies Relating to the Practice of Catch-and-Release Fishing in Western and Interior Alaska

Investigator(s): Sport Fish Division, Alaska Department of Fish and Game

FY2002 Budget: $ 59,000.00

Total Budget (2 years): $ 246,200.00

Geographic Area: Inter-Regional

Information Type: SST

Issues:

Contemporary sport anglers consider catch-and-release a legitimate, responsible, and often desirable fishing practice. However, subsistence users in western and interior rural Alaska do not release their catches and question whether there is sufficient knowledge, applicable to Alaska, to determine the fate of released fish and to assess the potential effects of catch-and-release sport fisheries on subsistence fishing opportunity. A comprehensive summary of scientific studies of catch-and-release is not available to fishery managers and resource users, nor has there been any assessment or review of potential applications of catch-and-release practices to western and interior Alaskan fisheries. This project would coalesce and review existing information regarding effects of catch-and-release, and then convene a working group composed of subsistence users, sport users, and fishery managers to examine this information. The working group would develop recommendations for a comprehensive strategy regarding assessment of catch-and-release effects on subsistence fishery resources.

Objectives:

1) Coalesce available scientific studies concerning effects of catch-and-release on fish and assess their reliability and applicability to Alaskan fisheries.
2) Produce a catch-and-release database of these studies on the Internet, including references, comments on reliability and applicability to Alaskan fisheries, and links to each study.
3) Make specific recommendations to State and federal agencies for interpreting and using existing information, for establishing protocols for conducting studies, and for conducting any needed studies.

A comprehensive literature search would be conducted of all scientific journals, and additional searches would be made for State, federal, and Tribal reports, academic theses, and other sources of information. Most searches would be done through the Alaska Resources Library and Information Services. All studies found would be reviewed for both scientific reliability and applicability to Alaskan fisheries. For each study reviewed, an abstract or summary, complete reference, and review of reliability and applicability would be made available on the Division of Sport Internet site. Full-text, downloadable files of each study report would also be made available, if permission could be obtained.

During the second year of the project, a working group, composed of subsistence users, sport users, and fishery managers, would be convened to examine compiled catch-and-release study information. Group members would include fishery biologists and social scientists from State and federal agencies, as well as representatives of user groups. The group would review compiled catch-and-release information, make recommendations for interpreting and using the information, inventory catch-and-release fisheries within the area covered by the project, and identify any issues of concern. The group would also make recommendations on the needed for any further studies of catch-and-release effects, including design and conduct any needed studies, and how to use this information in management of fisheries resources. All this would be used to design a comprehensive strategy to further assess catch-and-release issues in western and interior Alaska.

Deliverables/Products:

Two main products would be available from this work. The first would be a centralized database, accessible from the Division of Sport Fish Internet site, of catch-and-release study information, in the form of full-text downloadable files and annotations concerning reliability and applicability. The second would be a written report that could serve as a comprehensive strategy guide for assessing catch-and-release issues in western and interior Alaska. The report would include a review of available catch-and-release information, recommendations for interpreting and using this information, an inventory of catch-and-release fisheries within the project area, identification of issues of concern; recommendations for further studies of catch-and-release effects, protocols on design and conduct of any needed studies, and suggestions on use of this information managing fisheries resources.

Experience of Investigator(s):

The Alaska Department of Fish and Game, Division of Sport Fish, has a long history of high quality fisheries data collection and analysis activities. The principal investigator has a strong technical fisheries background that has included the design and conduct of catch-and-release mortality studies. Other staff biologists assisting with this work also have many years of experience conducting and evaluating catch-and-release studies as well as experience in coalescing data from diverse sources. In addition, the investigator will have access to biometric support as well as computer specialists with expertise in creating and maintaining Internet sites. The Alaska Department of Fish and Game is a founding member of Alaska Resources Library and Information Services and has a full-time librarian available to assist with searches and

obtaining copies of catch-and-release studies.

Partnerships/Collaboration/Consultations:

Development of a comprehensive database on catch-and-release effects on fishes would provide a valuable tool for future capacity building between fishery management agencies and affected user groups. Formation of a working group composed of subsistence users, sport users, and fishery managers to examine this information and develop recommendations would build partnerships and develop the capacity of subsistence users to actively participate in the development of resource management strategies.

Justification:

The Technical Review Committee requested this proposal due to broad concern with effects of catch-and-release sport fishing within many arctic, western, and interior Alaska rural communities. Regional Councils for these geographic areas have identified concern with delayed mortality resulting from catch and release fishing as an issue, and have request specific studies addressing the following issues: 1) long-term mortality of released angler-caught sheefish, char, and other freshwater species, including fish that are caught multiple times; 2) delayed mortality of angler caught and released northern pike from the Innoko River and elsewhere; and 3) effects of catch and release fishing on salmon and trout behavior, mortality, and spawning success. The Technical Review Committee suggested that a working group be formed to address the general issue of catch-and-release hooking mortality by conducting an inventory of catch and release studies done within this area, examining the applicability of existing data on catch-and-release mortality as practiced within this area, and developing recommendations for any additional studies on catch-and-release mortality. The Office of Subsistence Management solicited this proposal as a vehicle to develop such a working group. Technical Review Committee requested several modifications to the original proposal and resulting investigation plan, and the investigator incorporated most of these into the last version submitted. The cost of this effort has been substantially reduced from the original request, and does not seem unreasonable when compared to the cost of past working group funded under this program. Partnership and capacity building would occur through dissemination of information of catch-and-release fish mortality studies, through participation of subsistence users in the working group, and through review of working group products by Regional Advisory Councils, rural residents, and local and regional organizations. Some reviewers still have concerns about using Subsistence Fishery Resource Monitoring Program funding to conduct work on effects of catch-and-release sport fishing on fishes. Also, while several Regional Advisory Councils and local communities have identified catch-and-release fishing effects on local fishery resources as an issue of concern, no letters of support for this study have been received. Therefore, the strategic importance of this particular study to subsistence users may not be as great as was originally anticipated by the Technical Review Committee.

Recommended For Funding

02-043
Alaska Subsistence Fisheries Database GIS Integration

Investigator(s): Division of Subsistence, Alaska Department of Fish and Game

FY2002 Budget: $ 27,525.00

Total Budget (1 year): $ 27,525.00

Geographic Area: Inter-Regional

Information Type: HM/TEK

Issues:

Public access to information on subsistence fisheries is an important part of the federal management and regulatory process. There is a need to make information on subsistence harvests more easily accessible in a format that is easy to use and understand. Since fishery resource use is highly regionalized within the State, a Geographic Information System would allow users to better visualize and understand where and how different communities use various fish species throughout the year. Being able to use maps to illustrate this information would be more effective and intuitive than depictions of these data using tables and charts.

Objectives:

1) Link subsistence fisheries information contained within the Alaska Subsistence Fishery Database maintained by Division of Subsistence, Alaska Department of Fish and Game to the Geographic Information System of anadromous stream information maintained by Division of Habitat, Alaska Department of Fish and Game.
2) Create search and query options, tools, and menus within integrated database to allow users to graphically display subsistence fishery information by community, location, or drainage.
3) Provide access to the Geographic Information System on the World Wide Web.

Methods:

The Southeast Subsistence Fisheries Geographic Information System Database, developed by the investigator and his agency during studies FIS 00-039 and 01-103, would serve as a model for this statewide project. The system of organization of numerical harvest data and analytical approaches established for the Southeast project would be adopted for the statewide information. Spatial relationships between fishing communities and streams have previously been developed in various community use area research and Southeast Alaska harbor seal harvest research projects.

To keep pace with the changing Geographic Information System technology, the Division of Subsistence would upgrade its ArcView version 3.2 software to the newly released version 8.1. Customization of this software would be accomplished using Visual Basic programming language to design query boxes, pull-down menus, summary maps and chart options. Special buttons, toolbars, and menus would be programmed to perform specific tasks for working with Alaska Subsistence Fishery Database information. To accomplish this in the most efficient and effective manner, the investigator would attend a training class in Visual Basic.

Existing Alaska Department of Fish and Game electronic map coverage would be used as base maps for the Geographic Information System. Features on the maps would be linked to data records from the Alaska Subsistence Fishery Database by converting subsistence fishery data from a Microsoft Access format to Dbase and then transferring these data into ArcView. This linking, or geo-referencing, of graphically depicted landscape features to data records was anticipated during development of the Alaska Subsistence Fishery Database through the use of the same stream reference codes contained in the anadromous fish stream Geographic Information System data catalogue maintained by Habitat and Restoration Division, Alaska Department of Fish and Game. Information related to a specific community would be linked to the map using the community name as the geo-referencing variable.

In addition to the data contained in the Alaska Subsistence Fishery Database, the Geographic Information System would contain other geographic data relevant to subsistence fisheries. For example, locations of regulatory markers defining different subsistence fisheries, showing the boundaries in and around the water bodies where fishing is permitted, would be available in the program.

The Geographic Information System would be designed and made available for public use as both a self-contained, portable system on CD-ROM, to be run using either ArcView GIS software or the free Arc Explorer program, and as an Internet application. Users would be able to select harvest information of interest by using search criteria such as year, community, fish species, and water body. Results of database selections would be displayed in the form of graphs and charts within the project. Queries based on data parameters such as communities with greatest harvests, communities with a certain level of participation, or streams with a certain number of fish harvested, would also be possible. Communities and water bodies that fit the criteria used would also be illustrated on a map. The uniform data structure of the Geographic Information System and database projects would ensure that functionality of the system would be maintained with addition of each year's harvest information.

Deliverables/Products:

The Alaska Department of Fish and Game, Division of Subsistence will produce a CD-ROM of the completed project, containing a number of scalable maps with geographic features linked to the subsistence fisheries harvest information found in the Alaska Subsistence Fishery Database. The CD-ROM will be delivered to, and demonstrated for the Office of Subsistence Management, Fisheries Information Services Division, and training in the use of the GIS will be made available. CD-ROMs would also be made available to other appropriate federal and

needed, local communities and Regional Advisory Councils would receive a demonstration of the project. The Internet-based application will also be demonstrated and made available to the public.

Experience of Investigator(s):

The Alaska Department of Fish and Game, Division of Subsistence, has generated, collected, and stored geographic information related to subsistence fisheries harvests for 20 years. The principal investigator has worked with Division of Subsistence spatial data for over two years. Projects he has worked on and supervised include a Southeast Alaska harbor seal harvest location atlas, ten different community harvest use area mapping projects, and a Southeast Alaska Subsistence Fisheries Geographical Information System Database (FIS 00-039 and FIS 01-103), which would served as a model for this proposed statewide project.

Partnerships/Collaboration/Consultations:

As has been done for the Southeast project, the Alaska Subsistence Fisheries Geographic Information System project would be available for review and use by Regional Subsistence Councils, local governments, environmental programs, and resource managers. The project would have a statewide perspective to provide access to data contained in the Alaska Subsistence Fisheries database. Individual communities or agencies could use the database as a tool in their own research, with maps and charts available for illustration and organizational purposes. For example, Division of Subsistence meetings with the Organized Village of Kake in the summer of 2000, to demonstrate and discuss the Southeast Subsistence Fisheries Geographic Information System project, led the Village to use the Geographic Information System as a model for their own traditional use area mapping and documentation projects. Other groups may choose to modify the Geographic Information System for their own particular needs as well.

Justification:

This project would provide a graphic means for selecting, analyzing, and displaying subsistence fishery information. Development and distribution of this Geographic Information System database is intended to facilitate research and fisheries management by local organizations and individuals as well as agencies. Some Regional Advisory Councils have expressed concern about the value of statewide proposals, since they feel relationships to regional priorities, regional partnerships, and regional benefits are often unclear. Benefits of this project include making in- and postseason data more easily and widely accessible via the Internet or self-contained CD-ROM systems. This information would be available as a statewide database, using a Southeast project conducted by the investigator as a prototype. Products from this work would be immediately useful for fishery managers, and would serve to build capacity for regional and local organizations by providing assess to important information. Project objectives are clear and achievable, methods are technically sound, and identified products would be of wide general use. The investigator and his agency have the technical and administrative expertise to complete this project, as demonstrated by their established track record with similar projects. Consultations are ongoing at the regional level. While there are no local partners to assist in conducting the work,

results of the project would be readily available to agencies and communities in a familiar format. Several local residents, communities, and organizations have expressed concern with making some types of subsistence information widely available through publicly accessible databases, particularly on the Internet. The Office of Subsistence Management will be working with both the Solicitors Office and Contracts and Government Services Division to identify appropriate information sharing standards that can be established under existing laws and regulations. This issue is also being addressed the Statewide Database Working Group funded under study FIS 01-054.

Not Recommended For Funding

02-047
Alaska Subsistence Salmon Harvest Timing (Phase 1): Bristol Bay, Chignik District, Cook Inlet, and Kuskokwim Drainage

Investigator(s): Division of Subsistence, Alaska Department of Fish and Game

FY2002 Budget: $ 13,991.29

Total Budget (2 years): $ 28,488.00

Geographic Area: Inter-Regional

Information Type: HM/TEK

Issues:

There is a lack of ready access to information on subsistence salmon harvests timing by community and harvest location. Such information is often needed to assess inseason harvest results, to evaluate impacts of regulatory changes on subsistence salmon harvest, and to select research sites for specific species and stocks. This project would also help to improve the practice of recording harvest dates on subsistence permits and calendars by demonstrating how harvest timing information can benefit subsistence users.

Objectives:

1) Provide a database of subsistence salmon harvests by date, species, and location for subsistence fisheries in Bristol Bay, Chignik District, Cook Inlet, and the Kuskokwim Drainage.
2) Graphically depict subsistence fishery harvest timing through charts showing percentage and estimated numbers of annual daily and cumulative harvest for selected time periods.
3) Provide a standard framework, based upon the Alaska Subsistence Fisheries Database, which can be easily updated and expanded to accommodate harvest-timing data from all subsistence fisheries.
4) Promote daily reporting of subsistence harvests on permits and calendars by demonstrating the utility of harvest timing information in fisheries management.

Methods:

This project would provide harvest timing information from subsistence salmon fisheries harvest assessment programs administered by the Division of Subsistence, Alaska Department of Fish and Game, in Bristol Bay, Chignik District, Cook Inlet, and the Kuskokwim Drainage. It would serve as a model for providing this information on a statewide basis. In certain situations, when

salmon run timing information is not available, harvest timing can be used to estimate run timing. However, harvest timing can often differ from salmon run timing due to local conditions and management regulations that can influence harvest and preparation activities disproportionately to resource availability.

The source of harvest timing information used for this study would be reported harvests by date between mid-May to mid-October, which would accommodate the general period of salmon runs. The harvesting of spawned out salmon ("redfish") is poorly represented by dates of harvest, since this activity frequently occurs after permit reporting period or village surveys end. Thus, estimates of numbers of species harvested would exclude late season harvests of redfish, which is a common occurrence in certain fisheries within Bristol Bay and the Chignik areas. Harvests without specific dates would be excluded from analyses. Timing of harvests of individual species by location and user residence would be extracted from permits and calendars for each subsistence fishery. Efforts would be made to identify community, location, and year combinations for which harvest information is poorly documented. Timing data would be placed within a database modeled after, and using conventions developed for the Alaska Subsistence Fisheries Database and established by the Subsistence Fisheries Harvest Assessment Working Group in 2001 during study FIS 00-017. The resulting database would be constructed so that it could be queried for fishery, species, and location to produce tables and charts of harvest timing for specified years or multiyear averages representing either percentages or estimates of harvest numbers. Use of this database would replace the existing approach of creating tables and charts within Excel. Not only the existing method tedious, since it requires previous summarizing of data, but it also entails reiteration of all steps for each update of a year and location. This has resulted in limited usage of this information, use of out-of-date information, and a greater potential for the introduction of errors.

The summarized harvest timing information from the database would be readily available in seven formats: 1) tables showing daily percentage and cumulative percentage harvests by date; 2) tables showing estimated numbers of daily harvest and cumulative harvest by date (exclusive of "post-season" harvests); 3) charts of cumulative percentages; 4) charts of estimated cumulative inseason harvests; 5) charts of daily percentages; 6) charts of estimated daily inseason harvests; and 7) data to export into Excel spreadsheets for further analysis.

The database would be demonstrated in Anchorage for interested agencies and organizations, as well as during regional harvest monitoring workshops organized under study FIS-01-107. Initially, the harvest-timing database would be distributed on CD-ROM as separate Access 2000 entities to make it compatible with the limited computer resources that exist in many rural communities. Future integration of the harvest-timing database with the existing Alaska Subsistence Fishery Database would be explored for usefulness and utility.

Deliverables/Products:

The investigators would provide a CD-ROM containing both the Alaska Subsistence Fisheries Database and the Alaska Subsistence Harvest Timing Database in Microsoft Access 2000 to the Office of Subsistence Management and other interested agencies and organizations. An

Experience of Investigator(s):

The Division of Subsistence, Alaska Department of Fish and Game currently administers subsistence fisheries harvest reporting for the Bristol Bay area, Chignik area, Cook Inlet area, and the Kuskokwim Drainage; and has been responsible for the creation and maintenance of several databases that facilitate understanding and managing subsistence resources. Microsoft Access databases developed include the Alaska Subsistence Fisheries Database and the Community Profile Database.

Partnerships/Collaboration/Consultations:

All proposed work would be done using information collected as part of existing harvest assessment and permit systems, which have existing partnerships with various rural communities and organizations. The model developed would allow opportunities for collaboration with organizations with limited database experience that wished to add fisheries (both salmon and non-salmon species) to the database.

Justification:

This statewide project would provide harvest timing information for subsistence fisheries managed by Alaska Department of Fish and Game, and could be used as a model to develop similar capabilities for other subsistence fisheries within the State. A summary of ten years of existing data would be included in a Microsoft Access database, which would be distributed on CD-ROMs. The data would be readily available to all users, and in this sense builds capacity for partners. Bristol Bay, Chignik, Cook Inlet, and Kuskokwim Drainages all have rivers and streams under federal fishery management jurisdiction. While this proposal does not directly address an issue identified and prioritized by the Regional Advisory Councils, the project would facilitate State and federal management of salmon, including some populations of concern. By providing easy access to harvest timing curves, this type of information would be more readily used in making management decisions. Study objectives are clear and achievable. The study is appropriately designed, and the methods are technically sound. The products identified are acceptable, and would be of use to federal managers within a regional context. The investigator and agency both have technical and administrative expertise to conduct this work, as well as an excellent track record with past projects and cooperative ventures. The project would use existing subsistence data, so no additional field collections would be required. Consultations are ongoing at the regional level, and results would provide more ready access to the data for rural residents. The project would not employ or train any local residents, or be conducted in partnership with any local organizations. Several local residents, communities, and organizations have expressed concern with making some types of subsistence information widely available through publicly accessible databases, particularly on the Internet. The Office of Subsistence Management will be working with both the Solicitors Office and Contracts and Government Services Division to identify appropriate information sharing standards that can be established under existing laws and regulations. This issue is also being addressed the Statewide Database Working Group funded under study FIS 01-054.